



Specifications

# SAFE HAVEN WOMEN'S SHELTER

*Duluth, MN*

Project #

# 020115.00

*September 24<sup>th</sup>, 2020*



SECTION 00 01 01

PROJECT MANUAL TITLE AND REGISTRATION SHEET

SAFE HAVEN WOMEN'S SHELTER  
DULUTH, MINNESOTA

DATE: SEPTEMBER 24<sup>TH</sup>, 2020

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PROJECT NO.: 20115.00

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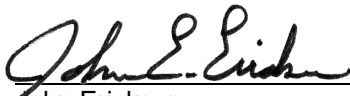
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I hereby certify that these Drawings and Specifications were prepared by me or under by direct supervision and that I am a duly registered Architect under the laws of the State of Minnesota.



John Erickson

Reg. No. 24199

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END OF SECTION





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DULUTH, MINNESOTA**

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**SECTION 00 31 00**  
**AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 GEOTECHNICAL REPORT**

- A. Subsurface Soil Exploration Report by EPC Engineering & Testing dated July 16, 2021. Report Project Number is 21G1524 and signed and stamped by Gary E. Hage P.E. State of MN Licensed Professional Engineer.

- 1. Appended to this section.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**





# **SUBSURFACE SOIL EXPLORATION REPORT**

Proposed Safe Haven Remodel  
Duluth, MN

Prepared For:

DSGW Architects  
2 West First Street, Suite 201  
Duluth, MN 55802

Prepared By:

EPC Engineering & Testing  
539 Garfield Avenue  
Duluth, MN 55802

SUBSURFACE SOIL EXPLORATION REPORT

Proposed Safe Haven Remodel  
Duluth, MN

PREPARED FOR:  
DSGW Architects  
2 West First Street, Suite 201  
Duluth, MN 55802

EPC Engineering & Testing Project No. 21G1524

I hereby certify that this report was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the Laws of the State of Minnesota.



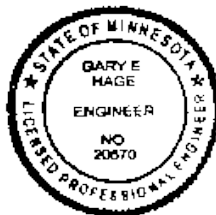
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Gary E. Hage, P.E.  
Registration No. 20670

7/16/2021

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Date



EPC Engineering & Testing  
**Geotechnical-Environmental-Materials-Engineering**  
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July 16, 2021  
EPC #21G1524

DSGW Architects  
2 West First Street, Suite 201  
Duluth, MN 55802

Attn: Ms. Katherine Gerzina, AIA, NCARB, Fiwel Ambassador  
Senior Project Architect: MN

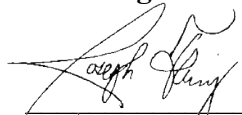
Re: Subsurface Soil Exploration Report  
Proposed Safe Haven Remodel  
2010 East 7<sup>th</sup> Street  
Duluth, MN 55812

Dear Ms. Gerzina,

Enclosed is EPC Engineering & Testing's (EPC) geotechnical engineering report for the above-referenced project. We have prepared this report and based our conclusions and recommendations upon current applicable professional standards. Copies of this report are furnished only to provide the factual data that was gathered and our interpretations with respect to this project, not to provide information regarding environmental concerns potentially associated with this site. Soil samples from this project will be saved for a period of two months from the date of this report, unless we are instructed in writing to do otherwise.

If you have any questions concerning the data or recommendations presented, or if we may be of further service on this project, please call. We appreciate the opportunity to be of service to your company on this project.

Respectfully submitted,  
**EPC Engineering & Testing,**



---

Joseph Thiry  
Project Engineer

C: Mr. Mark Udd, P.E. - Northland Consulting Engineers

**SUBSURFACE SOIL EXPLORATION REPORT**

**Proposed Safe Haven Remodel  
Duluth, MN**

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## **EXECUTIVE SUMMARY**

The subsurface conditions beneath the site were generally found to be fill soils over the suspected bedrock surface as defined by substantial auger refusal. The conditions were deemed acceptable for the proposed project provided that the foundations are placed on bedrock, as we understand the intended scope of construction. In summary, we recommend removing all fill, organic containing, and all soft/loose soils from each of the two proposed addition areas (West and East Additions). This consisted of approximately 8.5 to 10 feet of removal near the West Addition (Front) borings (Boring 1 and 2), and approximately 3 to 7 feet of removal near the East Addition (Back) borings (Boring 3 and 4). Notably, Boring 3 and 4 were offset approximately 20-feet and performed at higher elevations (approximately 5-feet) than the proposed location of the East addition. However, the estimated fill removal near this addition accounts for the discrepancies in elevation. We also recommend using a maximum allowable bearing capacity of 10,000 psf for foundations placed on the clean, flat, level bedrock surface, and/or pinned to it. More specific details are summarized in the Conclusions and Recommendations sections of this report.

# **SUBSURFACE SOIL EXPLORATION REPORT**

Proposed Safe Haven Remodel  
Duluth, MN

## **SCOPE OF INVESTIGATION**

This report presents the results of a subsurface soil exploration program for the proposed project referenced above. This investigation was performed at the direction of the Senior Project Architect, Ms. Katherine Gerzina, of DSGW Architects by EPC Engineering & Testing (EPC) proposal dated June 11, 2021. Ms. Gerzina, with recommendations of EPC, defined the scope of work performed in this subsurface exploration program.

This investigation was directed towards defining the subsurface conditions beneath the proposed site for the proposed Safe Haven remodel (two additions: East and West) construction project. Field explorations and laboratory studies were performed to evaluate soil engineering properties at the site. The project architect provided information about the project. A geotechnical investigation had not been conducted on this site before this investigation.

EPC Engineering & Testing (EPC) has prepared this project report for design purposes only; it may not have sufficient subsurface information to prepare an accurate construction bid. EPC recommends that the contractors preparing bids or proposals for this project be provided with copies of this report and the soil boring logs, as supplemental information to the drawings and specifications, not as a part of the Contract Documents.

## **PROPOSED PROJECT**

The proposed project, as described by Ms. Katherine Gerzina consists of two (2) proposed addition areas, which are defined by the site map in the Appendix of this report (East Addition and West Addition). The East and West Additions are approximately 1080 ft<sup>2</sup> and 690 ft<sup>2</sup>, respectively. Proposed construction for each of the two additions is to be a continuously heated, two-story (basement included), wood framed structure with strip footing concrete foundations placed on bedrock. Foundation walls are anticipated to be constructed from either masonry or concrete.

Maximum structural loading conditions will reportedly be 20 kips for columns and 5 kips per linear foot (klf) for strip footings. The proposed finished floor elevation of the additions' "basement" (Level 1) is approximately 89.3 feet, according to EPC's assumed elevation datum. This results in an elevation decrease of approximately 6 to 8 feet near west addition and an elevation decrease of approximately 0 to 1 foot near the east addition to bring the existing ground elevation to finished floor elevation (Level 1).

Changes in the nature, design, or location of all or parts of this project may occur during development. The conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed by the soils engineer. EPC will then make recommended changes or modifications to this report in writing only.

## **SITE CONDITIONS**

### **Geological Setting**

Through an understanding of the geological history and processes of any area, we are better able to define and understand the range of geotechnical properties observed in the geological materials encountered at the site. Knowledge of the anticipated subsurface profile at the site is essential for interpreting and correlating the borings from any geotechnical exploration program.

Based upon information from geological survey reports, and previous soils investigations in the area, the properties of the surficial soils at or near this project site are interpreted as being related to geological deposits of glacial till soils and relatively shallow (less than 50 feet) bedrock.

The native unconsolidated materials consist mainly of ground moraine of the Mille Lacs-Highland Moraine Association. Generally, sandy, stoney, and relatively thin glacial till. The soil deposit is associated with the Superior Lobe (Pleistocene, Late Wisconsinan) – generally reddish brown drift.

Bedrock consists of a Precambrian mixed suite of basalts (gabbros), andesites and rhyolites of the North Shore Volcanic Group. Bedrock is often observed at/near the existing ground surface near this site.

Geologic Map of the Lake Superior Region, Minnesota Geological Survey, 1982. Geologic Map of MN, Quaternary Geology, MN Geologic Survey, 1982. The map of the Duluth Complex and related rocks, northeastern MN, J.D. Miller, et.al., 2001. Geologic Map of Minnesota, Bedrock Geology, compiled by G.B. Morey and Joyce Meints, Third Edition, 2000.

### **Site Topography**

Topography at the proposed remodel site included moderate elevation discrepancies throughout the property. However, elevation differences between the boring locations was relatively insignificant. Maximum elevation change between borings was about 3.5 feet (Boring 4 and Boring 5). Boring 3 and 4 (near east addition area) were offset and performed at a higher elevation (approximately +5-feet) than the proposed boring locations due to abrupt elevation differences, which resulted in drill rig accessibility issues.

### **Existing Adjacent Structures**

Existing adjacent structures include the current Safe Haven building and several single-family residential structures surrounding the property. No documented data was provided on these structures, but they appear visually from the outside to be operating satisfactorily.

## **FIELD EXPLORATIONS**

The subsurface exploration program consisted of five (5) soil borings, which included four (4) standard penetration test (SPT) (standard sampling intervals) and one (1) flight auger boring. Boring locations are shown on the boring location map in the Appendix. Proposed locations of the soil borings were determined by DSGW Architects and provided on a preliminary site map. However, several locations

required the proposed boring location to be offset due to accessibility concerns (abrupt elevation changes and obstructions). This included Boring 3, 4 (east addition area), and 5. Approximate boring elevations were determined by EPC personnel using basic survey methods (Auto Level), referenced from the temporary benchmark indicated on the diagram in the Appendix. Locations and elevations of the borings should be considered accurate only to the degree implied by the method used. Borings were conducted to below existing grade (BEG) considered practical to identify adverse soils for the proposed project. Each boring was ultimately terminated on the suspected bedrock surface (substantial auger refusal).

Borings were conducted with EPC's CME 55 truck mounted drill rig using 3-1/4-inch inner diameter hollow stem augers. Drilling and field-testing operations were performed on July 6, 2021.

At selected depth intervals in the borings, Standard Penetration Tests (SPT) were conducted in substantial compliance with ASTM Method D1586. The SPT data listed on the boring logs is the number of blows required to drive a standard split-tube sampler 12 inches (two six-inch increments) into undisturbed soil using a 140-pound automatic drive hammer dropped 30 inches per blow and calibrated to N67. After an initial "set" of six inches, the number of blows required to drive the sampler an additional 12 inches is known as the penetration resistance or "N" value. The "N" value is an index of the relative density of cohesionless soils and the consistency of cohesive soils.

Partially disturbed samples were obtained from the split-spoon Standard Penetration sampler. All samples were recovered and sealed in the field to preserve natural moisture content and returned to the laboratory for testing.

A field log was prepared for each boring by EPC's drilling supervisor. These logs contain factual information and field interpretation of the soil conditions observed between samples, as described in substantial compliance with ASTM D420 and D2488. These field logs are on file in EPC's office.

The final logs are included in the Appendix. These final logs represent the interpretation of the contents of the field logs after laboratory observations and testing of the field samples were complete. Final soil descriptions are based upon visual observation only. Soils are described in this report according to the Unified Soil Classification System (USCS), as outlined in the boring log key in the Appendix.

Water level readings were observed in the drill holes at the times and under the conditions stated on the boring logs. However, it must be noted that fluctuations in the level of the ground water may occur because of variations in the rainfall, temperature, subsurface materials and other conditions or factors different from those observed at the time of the measurements. It should be noted that such conditions are subject to change.



## **SUBSURFACE CONDITIONS**

### **Soil Conditions**

The subsurface soils encountered beneath this site generally consisted of four (4) basic stratigraphic units: (1) SILTY CLAYEY SAND (SC-SM) TO SANDY SILTY CLAY (CL-ML) TO SANDY CLAY (CL) – (FILL); (2) SILTY SAND TO SAND W/ SILT (SP-SM) – (FILL); (3) SILTY CLAYEY SAND (SC-SM) TO SANDY SILTY CLAY (CL-ML); and (4) PROBABLE BEDROCK as defined by substantial auger refusal. More specifically, the soil units are described as follows:

#### **UNIT 1- SILTY CLAYEY SAND (SC-SM) TO SANDY SILTY CLAY (CL-ML) TO SANDY CLAY (CL) – (FILL)**

Unit 1 fill soils were the most discovered soils during the investigation. The material was encountered at each of the five (5) boring locations and ranged in depth from 6 to 11.5-feet. The soil was generally brown to grayish brown in color, moist to wet in moisture condition, and contained trace amounts of gravel. Trace amounts of brick, bituminous, and organics were also discovered in this unit, which typically extended to the depth of the suspected bedrock surface (Boring 1, 3, 4).

#### **UNIT 2- SILTY SAND TO SAND W/ SILT (SP-SM) – (FILL)**

This soil unit was encountered at four (4) of the five (5) boring locations (Boring 2, 3, 4, and 5). In Boring 3, 4, and 5, this unit extended from the existing ground surface to a depth of approximately 2.5-foot BEG. The unit was discovered at a greater depth in Boring 2 and continued to a depth to the suspected bedrock surface (approximately 6 to 10-foot BEG). The material was generally brown in color, dry to moist to wet in moisture condition, and contained trace amounts of gravel. One mechanical gradation was performed from samples obtained at Boring 2 (Samples 4 and 5). Gradation test results yielded, 14.5% passing the #200 sieve.

#### **UNIT 3- SILTY CLAYEY SAND (SC-SM) TO SANDY SILTY CLAY (CL-ML)**

The soils of Unit 3 were encountered at only one location during this investigation (Boring 5). The material was brown in color, moist to wet to water bearing in moisture condition, and contained trace amounts of gravel. Soils encountered in this unit were in a medium to dense to very dense relative density state / stiff to hard consistency.

#### **UNIT 4 – PROBABLE BEDROCK**

The probable bedrock surface, as defined by substantial auger refusal was encountered in all five (5) of the proposed addition(s) borings from depths of 8.5 to 14-feet BEG. The shallowest refusal depth occurred in Boring 1 (near proposed west addition). The greatest depth to refusal occurred at Boring 5, however, the boring was offset approximately 20-feet northwest of the proposed location due to obstructions. Determining the identity of the refusal material was not requested as a part of this investigation, but bedrock is visible at the surface at nearby areas of the site.

## **Water Table Conditions and Cave-in Levels**

Water table observations at the times noted in the boring logs indicated that water was observed at two (2) of the five (5) locations (Boring 2 and 5). At each location water was observed, it appeared to be at/near the suspected bedrock surface. Water levels were only observed during the relatively short time borings remained open. No cave-in occurred after the borings were terminated.

## **LABORATORY TESTING**

Results of the field testing and observed subsurface conditions were evaluated to develop a laboratory testing program. Laboratory testing was directed towards determining existing natural moisture content and visual classification of all samples. Approximate unconfined compressive strength (UCS) by hand/pocket penetrometer (PP) and approximate dry density (DD) was determined for selected SPT samples. One (1) mechanical gradation and three (3) organic content tests were also determined of selected samples.

Results of the laboratory tests are shown on the enclosed boring logs and data sheets in the Appendix. Moisture content, mechanical gradation, and organic content test results are expressed in percent (%) on an oven dry weight basis, UCS/PP in tons per square foot (tsf) and/or pounds per square foot (psf), and DD in pounds per cubic foot (pcf).

## **ANALYSIS OF FIELD/LABORATORY DATA**

The basic criterion for the design of a foundation requires that the probability of a shear failure in the underlying soils to be reduced to an allowable level of risk for a given project. In addition, settlements or other vertical movements within these soils must not exceed the limits set for the particular type of structure to be supported.

The ultimate bearing capacity of a foundation soil depends upon the size, shape and type of foundation element, depth below the surface, and other related physical characteristics of the supporting soils. Bearing capacity failures will usually be confined to a depth beneath the footing equal to the footing width.

The relatively shallow depth to bedrock on this site affords an excellent foundation bearing material for the proposed project. For bedrock bearing capacity, the unconfined compressive strength is usually determined, along with RQD, and a factor of safety on the order of 6 to 10 is usually applied. Although deformation of the rock begins to occur at a compressive load less than the failure amount, the amount of deformation is less than the rock can withstand without noticeable movement. Therefore, at the given loading conditions the rock performs as an excellent foundation material, without significant concern for settlement. Where settlement may be of particular concern and with greater loads, more detailed bedrock core testing can be performed.

## **Bearing Capacity Shear Failure**

Bedrock coring was not requested as a part of this investigation. Therefore, no laboratory testing (compressive strength) of the presumptive bedrock beneath the site was performed. However, field interpretations during the investigation suggested that the refusal material is presumably hard and sound bedrock.

## **Bearing Capacity Settlement**

As discussed, settlement is an equally important criteria for determining the allowable bearing capacity or type of foundation. Settlement generally takes place quickly in granular soils, with the bulk of settlement occurring during or shortly after construction. Settlement of these soils is usually estimated from the standard penetration test (SPT) “N” values. Settlement of structures founded on cohesive soils generally takes place very slowly, over a long period of time compared to granular soils. The exact magnitude and time of settlement varies widely, depending upon the loading history of the soil, foundation type and size, and the magnitude of loads applied to the proposed foundations. Settlements on cohesive soils are usually estimated by performing a consolidation test or from the index and estimated soil strength and settlement properties. Considering the proposed addition(s) foundations will rest on bedrock, little, if any, settlement is expected to occur.

## **DESIGN REQUIREMENTS**

Based upon the above analysis of the bedrock observed beneath this site, it appears that a strip footing type of foundation is appropriate for this project.

### **Footings**

For a strip footing concrete foundation on bedrock, we offer the following recommendations for this project:

#### **1. Excavation requirements:**

Remove all topsoil, fill and all soft/loose soils to bedrock. It is anticipated that approximately 8.5 to 10-feet of removal will be required near the west addition area (Borings 1 and 2). Additionally, approximately 3 to 7-feet of removal is anticipated near the east addition area (Boring 3 and 4), as recommended in table below. Regrade / scarify / shape / compact, as necessary, so water does not pond on the subgrade after construction. Excavated soils should not be reused as engineered backfill beneath foundations. If reused, they should be used in non-drainage sensitive areas or as parking/drive area subgrade. It should be noted that a significant time-consuming effort could be required to adjust the moisture content to achieve adequate compaction of some of the more clayey soils.

Boring Number SB-21- —	Proposed Addition Area	Surface Elevation (ft)	Depth/Elevation to Bottom of FILL/COULD BE FILL soils (ft)	Depth/Elevation to Substantial Auger Refusal (ft)	Depth/Elevation to Water Table (ft)	Required Minimum Excavation Depth/Elevation (ft)
1	West	97.4	8.5 / 88.9	8.5 / 88.9	N/A	8.5 / 88.9
2	West	95.5	10.0 / 85.5	10.0 / 85.5	10.0 / 85.5	10.0 / 85.5
3*	East	95.2	9.0 / 86.2	9.0 / 86.2	N/A	3.1 / 86.2
4*	East	93.9	11.5 / 82.4	11.5 / 82.4	N/A	6.9 / 82.4
5	N/A	97.5	10.0 / 87.5	14.0 / 83.5	14.0 / 83.5	N/A

\*Boring performed at higher elevation (approximately 5-feet) than proposed addition area due to drill rig accessibility issues.

## 2. Frost Cover:

Provide at least 6 feet of frost cover to the bottom of all exterior and perimeter footings. Interior column footings and/or load bearing wall footings (if heated) may be placed as shallow as 1.5 feet below finished floor grade, to the bottom of the footing. If 6-feet of frost cover is not achieved, refer to the insulation details below for heated and unheated structures.

### *Shallow Insulated (perimeter) footing design for heated structure:*

A. 24 inch thick, thickened edge (or traditional shape), insulated footings, tapered to the floor slab, have proven successful in the past.

B. Assume a minimum design temperature of 65 degrees F, a freezing index of 2750 degrees days (°F), and a one-inch insulation thickness R-Value of 4.35.

C. Use a minimum of two inches of DOW “SM” insulation or an equal product (low moisture absorbing plastic foam insulation, closed cell extruded polystyrene) installed in two layers, overlapping the connected seams.

D. Place the insulation vertically downward along the outside edge of the thickened edge footing a distance of at least 12 inches below finished grade and at least 12 inches above the interior floor slab, on the outside wall. The insulation should be protected with a flashing on the top. You may wish to protect all of the insulation with parge coat, recognizing that it could corrode at the ground line over time.

E. Extend the insulation 48 inches beyond the outside of the foundation wall (48 inches past the footing edge if traditional shape footings), sloping away from the building slightly, for drainage purposes. The water table must be below the insulation at all times of the year.

F. The insulation thickness should be increased by 50% (three inches total) for a distance of 48 inches in both directions of the foundation walls, at the corners of the building.

G. The insulation should be protected from petroleum products, sunlight and damage from all types of surface traffic. A covering of 12 inches will usually suffice.

*Shallow Insulated footing design for an unheated structure (heated structures with continuous insulation under/against foundations and slabs are considered unheated):*

- A. Assume a freezing index of 2750 degree days (degrees F), and a one-inch insulation thickness R-Value of 4.35.
- B. Use a minimum of four inches of DOW “SM” insulation or an equal product (low moisture absorbing plastic foam insulation, closed cell extruded polystyrene) installed in layers, overlapping the connected seams. The compressive strength of the insulation should be at least 30 psi.
- C. Place the insulation under the entire slab and extended 96 inches beyond the outside of the foundation sloping away from the building slightly, for drainage purposes. The water table must be below the insulation at all times of the year.
- D. The insulation should be protected from petroleum products, sunlight and damage from all types of surface traffic. A covering of 12 inches will usually suffice.

### 3. Bearing Capacity

A maximum allowable bearing capacity of 10,000 psf is recommended for strip footings placed on clean, flat, level bedrock (and/or pinned to it).

### 4. Lateral Soil Pressure:

Lateral earth pressures for compacted engineered (sand) backfill are based on an estimated friction angle of 30° and moist unit weight of 120 pcf, resulting in equivalent fluid pressures (efp) of 40 pcf ( $K_a=0.33$ ), 60 pcf ( $K_o=0.500$ ) and 360 pcf ( $K_p=3.00$ ) for the active, at-rest, and passive cases, respectively. Hand operated compaction equipment should be used to compact the three-foot horizontal engineered section adjacent to basement walls.

## **Floor Slabs**

For floor slabs we recommend the following:

1. Remove all topsoil, fill and organics, to bedrock which should consist of the upper 8.5 to 10 feet near the west addition and approximately 3 to 7 feet near the east addition of the project area. Replace removed materials with imported engineered fill. Recommended excavation removal depths are shown in the above table.
2. Proof-roll all surfaces to receive slab concrete and/or engineered backfill with a loaded dump truck and/or multiple passes with a large vibratory sheeps foot roller, and remove any soft areas noticed. Compact (seal) with a large smooth drum roller (multiple passes) after proof rolling.
3. A subgrade modulus (k-Value) of 150 pci may be used for imported, granular, compacted engineered backfill.

4. A conventional clean sand cushion layer or a moisture barrier (vapor retarder) and a “base material” may be necessary under the concrete floor, pending any proposed floor coverings. The project architect or engineer should specify the type and placement / location of the base layer and moisture barrier, if required. The American Concrete Institute (ACI) Section 302 of the *Manual of Concrete Practice* discusses vapor retarders and base layers.

### **Foundation Alternatives**

In the event that the clean, flat, level bedrock surface is not achieved, foundations can be placed on compacted engineered fill, bedrock, and/or weathered rock using an allowable bearing capacity of 4000 psf.

### **Geotechnical**

We also offer the following geotechnical related design recommendations for this project.

1. Slope backfill next to the proposed addition(s) away from the foundation at a slope of 10H to 1V to promote drainage away from the structure.
2. Use footings constructed to the same depth of cover as the rest of the building (or the applicable insulation detail) to support canopy footings, door stoop slabs, porch floors or exterior planters, to reduce the risk of movement due to fill settlement or from frost heave. These areas should also be properly over-excavated. The stoop slabs should be constructed as structural members with a minimum six-inch air gap between the concrete and soil below.
3. Remove all underground utilities that may exist, and fill associated with them, and replace with compacted engineered backfill.
4. Foundation drain recommendation: Use a factory wrapped, perforated perimeter foundation drain near the exterior base of the footings (at the lowest limits of the rock subgrade outside the footing influence zone) and route to daylight or a storm sewer to reduce the risk of water ponding in the granular backfill. Surround the drain with filter aggregate and wrap it with filter fabric to reduce the risk of clogging. The subgrade inside the building should be sloped to drain to a low point and an interior foundation drain should also be used, connected to the exterior drain, or sumped out.
5. Clay cap: After completing foundation construction, place a one-foot thick clay (native/existing clayey fill soil) cap around the building, beneath the final topsoil. Extend the cap back to the native/fill soil. This procedure should create a virtually “closed system” which reduces the potential risk of water entering the foundation area after construction.
6. Care must be taken not to undermine the existing building foundation during excavation procedures.

## **GENERAL CONSTRUCTION REQUIREMENTS**

We offer the following recommendations for use in preparing plans and specifications for construction of this project.

### **General Excavation Requirements**

1. Remove all topsoil, vegetation, roots, grass or other visible organic material from areas that are to be excavated or receive fill. Separate topsoil required for the surface of the final site grading. Stockpile in a careful manner to the extent it is not mixed with other materials and will be available for landscaping uses on the site.
2. If foundation construction occurs under conditions of freezing temperatures, the base of all foundation excavations and backfill materials should be protected from freezing before and after concrete placement. Surfaces which may become frozen should be thawed before placing of foundation concrete. If freezing has loosened and reduced the bearing capacity of the excavation surface, remove the frozen (previously frozen) material to the undisturbed surface. Place the foundation upon that undisturbed soil or compacted engineered backfill. Slab-on-grade soils should not be constructed over frozen soils. Frozen material should not be used as backfill.
3. Selection of compaction procedures and equipment should be the responsibility of the contractor. In general, compaction of cohesive soils is usually best achieved with a sheeps foot compactor. Cohesionless soils are usually best compacted with a vibrating roller or vibrating plate compactor.

### **General Backfill Requirements**

A wide variety of materials may usually be considered as suitable for engineered backfill. The choice of materials is a function of the structural requirements, water table conditions, seasonal construction constraints, placement and compaction methods, and other site/project specific needs. Granular materials which classify as GW, GC, SW, SM, and SC according to the USCS (ASTM D4287) are usually the most suitable engineered backfill. Poorly graded gravels and sand (GP and SP) are generally less desirable because they are usually more difficult to compact. Where frost action is of concern, silty or clayey granular soils with as little as 3-5% of the particles passing the No. 200 sieve can be unacceptable. Inorganic clays and silts of low to medium plasticity (CL and ML) are not suitable for backfill on this project, but they may be used for general site grading and landscaping. Soils of high plasticity (CH, MH) are unsuitable.

Specification for the gradation of engineered backfill used on this project should comply with the following general requirements:

1. No organic or other deleterious material.
2. Gradation (Except Class 5 and sand cushion or base layer):

<b>Sieve Size</b>	<b>Percent Passing</b>
<b>3 inch</b>	<b>100</b>
<b>2 inch</b>	<b>85-100</b>
<b>3/4 inch</b>	<b>71-100</b>
<b># 4</b>	<b>50-80</b>
<b>#200</b>	<b>7 max</b>

3. The upper 12 inches, directly under slab and foundation concrete, should contain no material larger than one inch.
4. Alternative gradations should be evaluated by the soils engineer for acceptability if these guidelines cannot be satisfied by locally available backfill materials within an economical distance of this project.

### **General Compaction Requirements**

The following compaction requirements are recommended for use in the project specifications.

1. Laboratory compaction standard for granular (non-cohesive) soils: ASTM D1557 - Modified Proctor.
2. Compact backfill to a minimum of the following percentage of the above compaction standard for the respective types of fill material.

<b>Type of Engineered Backfill (Granular)</b>	<b>Compaction/ Density</b>
<b>Foundation Structural Backfill</b>	<b>95%</b>
<b>Slab-on grade Backfill</b>	<b>90%</b>
<b>Non-structural Backfill</b>	<b>90%</b>
<b>Landscaped Areas</b>	<b>85%</b>
<b>Utility Trenches</b>	<b>90%</b>

3. Place engineered backfill or other fill materials in lifts not to exceed eight inches in a loose condition, unless the contractor can demonstrate satisfactory results by placing thicker lifts.
4. In general, fill materials should be placed and compacted within two percent of optimum moisture content, as determined by above applicable compaction standard. When fill materials are not in this range of moisture content, compaction to the required density may be difficult or not possible. The



excavating contractor should be required to be responsible for controlling and adjusting moisture content.

5. Flooding is not an acceptable procedure for compacting of backfill materials and should not be permitted.
6. Compaction of utility trenches in all areas of the project should not be overlooked. Narrow trenches and small areas often require use of small compaction equipment or tools. Thinner (four- to six-inch) lifts may be required to achieve successful compaction. This requirement should be clearly defined in the specifications and reviewed with the contractor or subcontractors performing utility work.
7. Excavation and engineered backfill operations should be observed by a qualified soils engineer or their designated representative. In-place density testing should be performed to document that the geotechnical recommendations and compaction requirements in this report are achieved.
8. For this project, we recommend a minimum density testing frequency of one test per 30 l.f. of footing trench backfill, one per column pad location and one per 400 s.f. of floor slab backfill, per lift. For isolated locations or doubtful areas, we recommend a minimum of one test per occasion, as recommended by the soils engineer.

## **CONCLUSIONS**

Based upon the five (5) soil borings drilled in the authorized exploration program and the above-described laboratory testing program, we have drawn the following general conclusions about the subsurface conditions beneath this site:

### **Soil Conditions**

The five (5) borings generally consisted of fill soils (Unit 1 and Unit 2) over the suspected bedrock surface as defined by substantial auger refusal. Fill depths ranged from 8 to 11.5-feet across the proposed remodel site. Native silty clayey sand soils (Unit 3) were only encountered at Boring 5 at a depth of 8 to 14-feet below existing grade. The suspected bedrock surface was encountered at each boring from depths ranging from 8.5 to 14-feet.

### **Water Table Conditions**

Water was observed at Boring 2 and Boring 5 during the short time the borings remained open. At each location, water was encountered relatively close to the suspected bedrock surface. Water should not be a significant problem during foundation excavation unless it is allowed to drain into and pond in open excavations. Dewatering is the responsibility of the contractor.

### **Allowable Bearing Capacity**

A maximum allowable bearing capacity of 10,000 psf is recommended for foundations on the clean, flat, level (and/or pinned to it) surface.

## **RECOMMENDATIONS**

In summary, we offer the following specific recommendations regarding design of the foundation and other geotechnical engineering aspects of this project.

1. Remove all topsoil, fill and very loose soils (8.5 to 10 feet in the west addition soil borings and 3 to 7 feet in the east addition soil borings) from the entire proposed addition(s) footprint.
2. Place foundations on clean, flat, level bedrock, and/or pin the footings to the rock. Use the proposed strip footing foundation with a maximum allowable bearing capacity of 10,000 psf. A foundation alternative is discussed on Page 9 of this report.
3. The design recommendations and specifications in the “Design Requirements” and “Construction Requirements” sections of this report should be followed.

## **LIMITATIONS OF EXPLORATION AND REPORT**

We have based the analysis and recommendations submitted in this report in part upon the data obtained from the five (5) soil borings. The nature and extent of variations between the borings may not become evident until construction. If variations then appear evident, it will be necessary for the soils engineer to re-evaluate the recommendations of this report.

As the soils engineer for this project, we recommend that we be provided an opportunity to do a general review of final design drawings and specifications for this project to determine that earth work and foundation recommendations contained herein have been properly interpreted and included in the design and specifications. We can assume no responsibility for misinterpretation or improper application of our recommendations and conclusions by others.

EPC further recommends that soil engineering and testing services be performed during construction of the excavation and foundation phases of the work. This procedure is to observe compliance with the design drawings, specifications, and EPC’s recommendations, and it also allows design changes to be made in the event that subsurface conditions differing from those anticipated before construction started are discovered and necessary changes can be recommended in a timely manner.

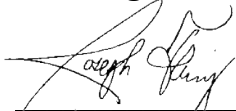
Responsibility to provide safe working conditions for earthwork and below grade aspects of this project is solely that of the contractors or subcontractors working on the project and is not the responsibility of EPC Engineering & Testing. All local, state, and federal requirements, statutes, ordinances, or building codes relating to slopes or temporary sheeting and bracing of trenches and excavations must be observed by contractors during construction.

EPC has prepared this report, consisting of 14 pages, Appendix and letter of transmittal, for the exclusive use of Ms. Katherine Gerzina, of DSGW Architecture and its designated representatives, for specific application to the design of the proposed Safe Haven Remodel near 20<sup>th</sup> Avenue East and East 8<sup>th</sup> Street in Duluth, MN, at the specific locations drilled. Copies of this report are furnished only to provide the factual data which were gathered and summarized in the report.

Professional services provided to this project by EPC Engineering & Testing were completed, findings obtained, and recommendations prepared using generally accepted engineering principles and practices. Conclusions and recommendations contained herein are based upon the applicable standards of our profession at the time this report was prepared. This warranty is in lieu of all other warranties, either expressed or implied.

Respectfully submitted,

**EPC Engineering & Testing**



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Joseph Thiry, P.E.  
Project Engineer

Reviewed by;



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Gary E. Hage, P.E.  
Principal Engineer



# **APPENDIX**

## **SUBSURFACE SOIL EXPLORATION REPORT**

**Proposed Safe Haven Remodel**

**EPC ENGINEERING & TESTING Project #21G1524**

# COMMON SOIL REPORT ABBREVIATION DEFINITIONS

AASHTO	American Association of State Highway and Transportation Officials
AB	After Boring Completion
BEG	Below Existing Grade
BFG	Below Finished Grade
CI	Confidence Interval
DD	Dry Density
DL	Dead Load
EOB	End of Boring
FS	Factor of Safety
kcf	Kips per Cubic Foot
LL	Live Load
mg/mk	Milligrams per Kilogram
N	Standard Penetration Resistance Value
pcf	Pounds per Cubic Foot
PID	Photoionization Detector
plf	Pounds per Lineal Foot
ppm	Parts Per Million
psf	Pounds per Square Foot
SPT	Standard Penetration Test
UCS	Unconfined Compressive Strength
WRT	With Respect To
WT	Water Table

## **BORING LOG KEY and SOIL CLASSIFICATION DATA**

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests <sup>a</sup>				Soils Classification	
				Group Symbol	Group Name <sup>b</sup>
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels 5% or less fines <sup>e</sup>	$C_u \geq 4$ and $1 \leq C_c \leq 3$ <sup>c</sup>	<b>GW</b>	Well-graded gravel <sup>d</sup>
			$C_u < 4$ and/or $1 > C_c > 3$ <sup>c</sup>	<b>GP</b>	Poorly graded gravel <sup>d</sup>
		Gravels with Fines More than 12% fines <sup>e</sup>	Fines classify as ML or MH	<b>GM</b>	Silty gravel <sup>d fg</sup>
			Fines classify as CL or CH	<b>GC</b>	Clayey gravel <sup>d fg</sup>
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands 5% or less fines <sup>i</sup>	$C_u \geq 6$ and $1 \leq C_c \leq 3$ <sup>c</sup>	<b>SW</b>	Well-graded sand <sup>h</sup>
			$C_u < 6$ and/or $1 > C_c > 3$ <sup>c</sup>	<b>SP</b>	Poorly graded sand <sup>h</sup>
		Sands with Fines More than 12% <sup>i</sup>	Fines classify as ML or MH	<b>SM</b>	Silty sand <sup>fg h</sup>
			Fines classify as CL or CH	<b>SC</b>	Clayey sand <sup>fg h</sup>
Fine-grained Soils 50% or more passed the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line <sup>l</sup>	<b>CL</b>	Lean clay <sup>k l m</sup>
			PI < 4 or plots below "A" line <sup>l</sup>	<b>ML</b>	Silt <sup>k l m</sup>
		Organic	Liquid limit - oven dried < 0.75	<b>OL</b>	Organic clay <sup>k l m n</sup>
			Liquid limit - not dried < 0.75	<b>OL</b>	Organic silt <sup>k l m o</sup>
	Silts and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	<b>CH</b>	Fat clay <sup>k l m</sup>
			PI plots below "A" line	<b>MH</b>	Elastic silt <sup>k l m</sup>
		Organic	Liquid limit - oven dried < 0.75	<b>OH</b>	Organic clay <sup>k l m p</sup>
			Liquid limit - not dried < 0.75	<b>OH</b>	Organic silt <sup>k l m q</sup>
Highly Organic Soils	Primarily organic matter, dark in color and organic odor			<b>PT</b>	Peat

### Particle Size Identification

Boulders	.....	over 12"
Cobbles	.....	3" to 12"
Gravel		
Coarse	.....	3/4" to 3"
Fine	.....	No. 4 to 3/4"
Sand		
Coarse	.....	No. 4 to No. 10
Medium	.....	No. 10 to No. 40
Fine	.....	No. 40 to No. 200
Silt	.....	< No. 200, PI < 4 or below "A" line
Clay	.....	< No. 200, PI ≥ 4 and on or above "A" line

### Consistency of Cohesionless Soils

Blows Per Foot (BPF)

Very loose	.....	0 to 4 BPF
Loose	.....	5 to 10 BPF
Medium dense	.....	11 to 30 BPF
Dense	.....	31 to 50 BPF
Very dense	.....	over 50 BPF

### Consistency of Cohesive Soils

Very soft	.....	0 to 1 BPF
Soft	.....	2 to 3 BPF
Rather soft	.....	4 to 5 BPF
Medium	.....	6 to 8 BPF
Rather stiff	.....	9 to 12 BPF
Stiff	.....	13 to 16 BPF
Very stiff	.....	17 to 30 BPF
Hard	.....	over 30 BPF

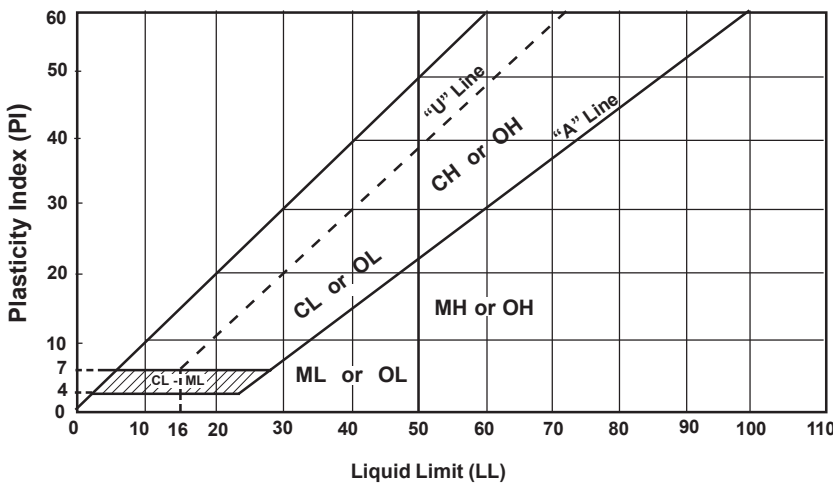
- Based on the material passing the 3-in (75mm) sieve.
- If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
- $C_u = D_{60} / D_{10}$      $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- If soil contains ≥ 15% sand, add "with sand" to group name.
- Gravels with 5 to 12% fines require dual symbols:  
GW-GM well-graded gravel with silt  
GW-GC well-graded gravel with clay  
GP-GM poorly graded gravel with silt  
GP-GC poorly graded gravel with clay
- If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
- If fines are organic, add "with organic fines" to group name.
- If soil contains ≥ 15% gravel, add "with gravel" to group name.
- Sands with 5 to 12% fines require dual symbols:  
SW-SM well-graded sand with silt  
SW-SC well-graded sand with clay  
SP-SM poorly graded sand with silt  
SP-SC poorly graded sand with clay
- If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
- If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
- If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
- PI ≥ 4 and plots on or above "A" line.
- PI < 4 or plots below "A" line.
- PI plots on or above "A" line.
- PI plots below "A" line.

### Water Level

Water levels indicated on the boring logs are measured at stated times. In pervious soils the elevations indicated are considered reliable levels. However, in impervious soils, even after several days of monitoring, accurate determinations may not be possible. Therefore, additional/alternate methods of ground water elevations should be sought.

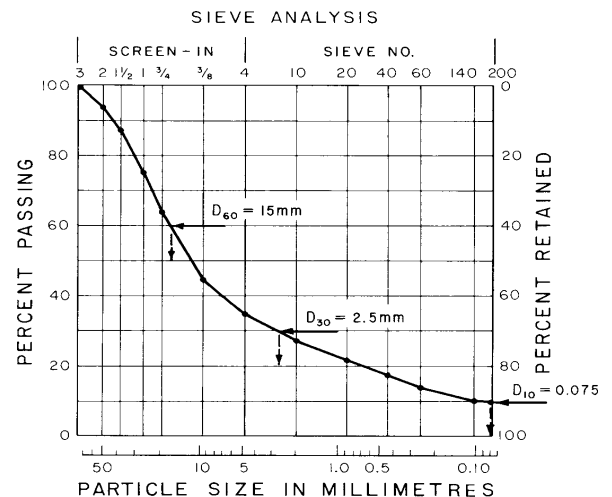
### Commonly Used Moisture Conditions of Soils are as Follows

Term	Meaning
Dry	-Requires addition of considerable moisture to attain optimum for compaction
Moist	-near optimum moisture for compaction
Wet	-requires drying to attain optimum moisture for compaction
Saturated (Water Bearing)	- very wet



Laboratory Tests

<b>DD</b>	Dry density, pcf	<b>OC</b>	Organic content, %
<b>WD</b>	Wet density, pcf	<b>S</b>	Percent of saturation, %
<b>MC</b>	Natural moisture content, %	<b>SG</b>	Specific gravity
<b>LL</b>	Liquid limit, %	<b>C</b>	Cohesion, psf
<b>PL</b>	Plastic limit, %	$\phi$	Angle of internal friction
<b>PI</b>	Plasticity index, %	<b>qu</b>	Unconfined compressive strength, psf
<b>P200</b>	% passing 200 sieve	<b>qp</b>	Pocket penetrometer strength, tsf



$$C_u = \frac{D_{60}}{D_{10}} = \frac{15}{0.075} = 200 \quad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = \frac{(2.5)^2}{0.075 \times 15} = 5.6$$



## **BORING LOCATION MAP**

# Proposed Safe Haven Additions

**Legend**

- Benchmark
- Soil Borings



## **BORING LOGS**

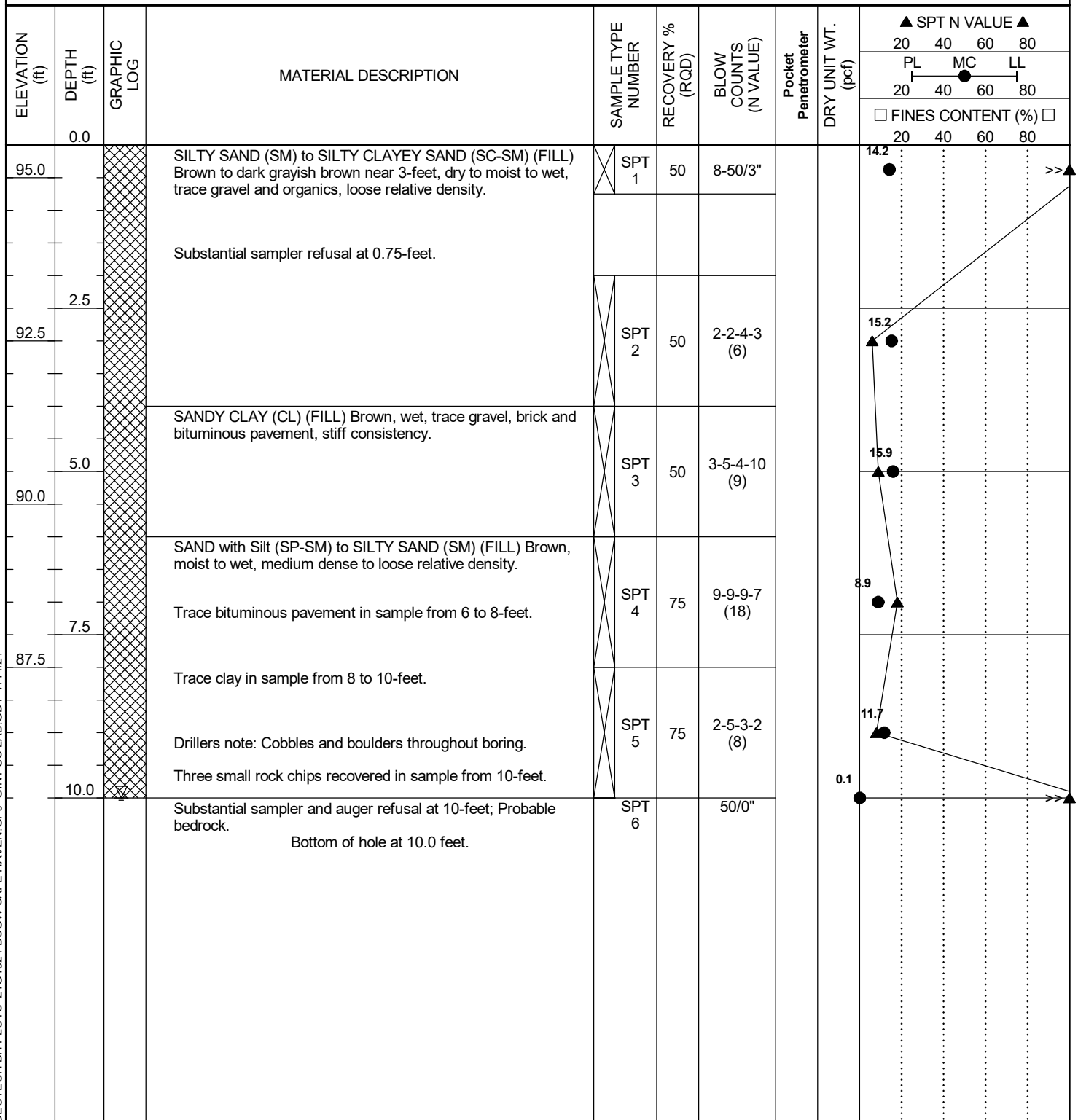
<b>CLIENT</b> DSGW	<b>PROJECT NAME</b> Safe Haven Addition
<b>PROJECT NUMBER</b> 21G1524	<b>PROJECT LOCATION</b> Duluth, MN
<b>DATE STARTED</b> 7/6/21 <b>COMPLETED</b> 7/6/21	<b>GROUND ELEVATION</b> 97.4 ft <b>HOLE SIZE</b> 7.25-inch
<b>DRILLING CONTRACTOR</b> EPC Engineering & Testing	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> CME 55 Truck w/HSA and SPT Calibrated to N67	<b>AT TIME OF DRILLING</b> None
<b>LOGGED BY</b> JT <b>CHECKED BY</b> GH	<b>AT END OF DRILLING</b> None
<b>NOTES</b>	<b>0hrs AFTER DRILLING</b> None

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Pocket Penetrometer	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲		
									PL	MC	LL
	0.0								□ FINES CONTENT (%) □		
			SILTY CLAYEY SAND (SC-SM) (FILL) Brown, dry, trace gravel, medium dense relative density.	SPT 1	25	11-12-14-8 (26)			6.4		
95.0	2.5		SILTY CLAYEY SAND (SC-SM) to SANDY CLAY (CL) (FILL) Brown, wet, trace gravel, loose relative density / medium consistency.	SPT 2	25	3-3-5-7 (8)			18.4		
			With clay and little silt mottle in sample from 4 to 6-feet.								
92.5	5.0		Poor recovery in sample from 6 to 8-feet - one, 1.4-inch piece of gravel recovered in sampler shoe. Moisture content was on clay stuck to the gravel.	SPT 3	25	2-3-5-5 (8)			24.6		
			Sample 5: Organic Content = 4.3%								
90.0	7.5		Drillers note: Cobbles and boulders encountered throughout boring.	SPT 4	4	2-3-3-1 (6)			20.7		
			Drillers note: Refusal material was very smooth like bedrock.	SPT 5	33	50			27.8		
			Substantial Sampler and Auger Refusal at 8.5-feet. Bottom of hole at 8.5 feet.								

GEOTECH BH PLOTS 21G1524 DSGW SAFE HAVEN.GPJ GINT US LAB.GDT 7/14/21



<b>CLIENT</b> DSGW	<b>PROJECT NAME</b> Safe Haven Addition
<b>PROJECT NUMBER</b> 21G1524	<b>PROJECT LOCATION</b> Duluth, MN
<b>DATE STARTED</b> 7/6/21 <b>COMPLETED</b> 7/6/21	<b>GROUND ELEVATION</b> 95.5 ft <b>HOLE SIZE</b> 7.25-inch
<b>DRILLING CONTRACTOR</b> EPC Engineering & Testing	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> CME 55 Truck w/HSA and SPT Calibrated to N67	▽ <b>AT TIME OF DRILLING</b> 10.0 ft / Elev 85.5 ft
<b>LOGGED BY</b> JT <b>CHECKED BY</b> GH	<b>AT END OF DRILLING</b> None
<b>NOTES</b>	<b>0hrs AFTER DRILLING</b> None



GEOTECH BH PLOTS 21G1524 DSGW SAFE HAVEN.GPJ GINT US LAB.GDT 7/14/21

<b>CLIENT</b> DSGW	<b>PROJECT NAME</b> Safe Haven Addition
<b>PROJECT NUMBER</b> 21G1524	<b>PROJECT LOCATION</b> Duluth, MN
<b>DATE STARTED</b> 7/6/21 <b>COMPLETED</b> 7/6/21	<b>GROUND ELEVATION</b> 95.2 ft <b>HOLE SIZE</b> 7.25-inch
<b>DRILLING CONTRACTOR</b> EPC Engineering & Testing	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> CME 55 Truck w/HSA and SPT Calibrated to N67	<b>AT TIME OF DRILLING</b> None
<b>LOGGED BY</b> JT <b>CHECKED BY</b> GH	<b>AT END OF DRILLING</b> None
<b>NOTES</b> Boring performed ~20-feet NE of proposed location due to access	<b>0hrs AFTER DRILLING</b> None

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Pocket Penetrometer	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲		
									PL	MC	LL
	0.0								□ FINES CONTENT (%) □		
95.0		[Cross-hatched pattern]	SILTY SAND (SM) (FILL) Brown, dry to moist, trace to with clay, trace gravel, very dense relative density.	SPT 1	17	16-50		4.2			
	2.5				SPT 2	17	50		7.8		
92.5		[Dotted pattern]	Concrete								
	5.0	[Cross-hatched pattern]	SANDY CLAY (CL) (FILL) Brown to grayish brown, wet, with 1-inch piece of wood, stiff consistency.	SPT 3	25	4-7-9-12 (16)		14.2			
90.0				FAT CLAY (CH) (FILL) Grayish brown, wet, very soft consistency.							
	7.5	[Cross-hatched pattern]	Sample 4: Organic Content = 6.9%	SPT 4	11	0-0-0-50/0"		41.5			
87.5				Substantial auger refusal at 9- feet; Probable bedrock. Bottom of hole at 9.0 feet.							

GEOTECH BH PLOTS 21G1524 DSGW SAFE HAVEN.GPJ GINT US LAB.GDT 7/14/21

<b>CLIENT</b> DSGW	<b>PROJECT NAME</b> Safe Haven Addition
<b>PROJECT NUMBER</b> 21G1524	<b>PROJECT LOCATION</b> Duluth, MN
<b>DATE STARTED</b> 7/6/21 <b>COMPLETED</b> 7/6/21	<b>GROUND ELEVATION</b> 93.7 ft <b>HOLE SIZE</b> 7.25-inch
<b>DRILLING CONTRACTOR</b> EPC Engineering & Testing	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> CME 55 Truck w/HSA and SPT Calibrated to N67	<b>AT TIME OF DRILLING</b> None
<b>LOGGED BY</b> JT <b>CHECKED BY</b> GH	<b>AT END OF DRILLING</b> None
<b>NOTES</b> Boring performed ~20-feet NE of proposed location due to access	<b>0hrs AFTER DRILLING</b> None

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Pocket Penetrometer	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲		
									PL	MC	LL
	0.0								□ FINES CONTENT (%) □		
92.5		[Cross-hatched pattern]	SILTY SAND (SM) (FILL) Light Brown, dry, trace gravel.	AUGER 1	100				5.3		
	2.5		SILTY CLAYEY SAND (SC-SM) (FILL) Brown, moist to wet, trace gravel.	AUGER 2	100				11.0		
90.0			SANDY CLAY (CL) (FILL) Brown, wet, trace gravel.								
	5.0										
87.5			Cobble at 6.5-feet.								
	7.5			AUGER 3	100				16.4		
85.0											
	10.0										
82.5			Drillers note: Smooth refusal material - probable bedrock.								
			Substantial auger refusal at 11.5-feet Bottom of hole at 11.5 feet.								

GEOTECH BH PLOTS 21G1524 DSGW SAFE HAVEN.GPJ GINT US LAB.GDT 7/14/21

<b>CLIENT</b> DSGW	<b>PROJECT NAME</b> Safe Haven Addition
<b>PROJECT NUMBER</b> 21G1524	<b>PROJECT LOCATION</b> Duluth, MN
<b>DATE STARTED</b> 7/6/21 <b>COMPLETED</b> 7/6/21	<b>GROUND ELEVATION</b> 97.5 ft <b>HOLE SIZE</b> 7.25-inch
<b>DRILLING CONTRACTOR</b> EPC Engineering & Testing	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> CME 55 Truck w/HSA and SPT Calibrated to N67	▽ <b>AT TIME OF DRILLING</b> 14.0 ft / Elev 83.5 ft
<b>LOGGED BY</b> JT <b>CHECKED BY</b> GH	<b>AT END OF DRILLING</b> None
<b>NOTES</b> Boring performed ~19-feet NW of proposed location due to access	<b>0hrs AFTER DRILLING</b> None

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	Pocket Penetrometer	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲				
									PL	MC	LL		
97.5	0.0								□ FINES CONTENT (%) □				
									20	40	60	80	
			SILTY SAND (SM) (FILL), brown, dry, trace gravel	AUGER 1	200								19.0
95.0	2.5		SANDY SILTY CLAY (CL-ML) Black to brown, wet, trace to little organics, trace gravel, stiff consistency.  Sample 2: Organic Content = 3.8%	SPT 2	100	5-4-5-5 (9)							13.5
92.5	5.0		SILTY CLAYEY SAND (SC-SM) (FILL) Brown, wet, with bituminous pavement, loose relative density.	SPT 3	100	3-5-13-13 (18)							16.2
90.0	7.5		SANDY SILTY CLAY (CL-ML) (FILL) Dark brown to grayish brown, trace gravel and organics, medium consistency.	SPT 4	100	7-3-3-5 (6)							17.6
87.5	10.0		SILTY CLAYEY SAND (SC-SM) to SANDY SILTY CLAY (CL-ML) to SILTY CLAYEY SAND (SC-SM) (Could Be Fill to 10-feet) Brown, wet to moist to wet to water bearing, medium to dense to very dense relative density / stiff to hard consistency.	SPT 5	100	2-4-9-13 (13)							15.3
			With clay in sample from 10 to 12-feet.	SPT 6	100	3-13-24-50 (37)							13.2
85.0	12.5		With sand in sample from 12 to 14-feet.	SPT 7	100	4-31-34-50 (65)	4.5+	120					13.8
			Drillers note: Sampler bounced at 14-feet.	SPT 8		50/0"							>>
			Substantial auger refusal at 14-feet; Probable bedrock. Bottom of hole at 14.0 feet.										

GEOTECH BH PLOTS 21G1524 DSGW SAFE HAVEN.GPJ GINT US LAB.GDT 7/14/21



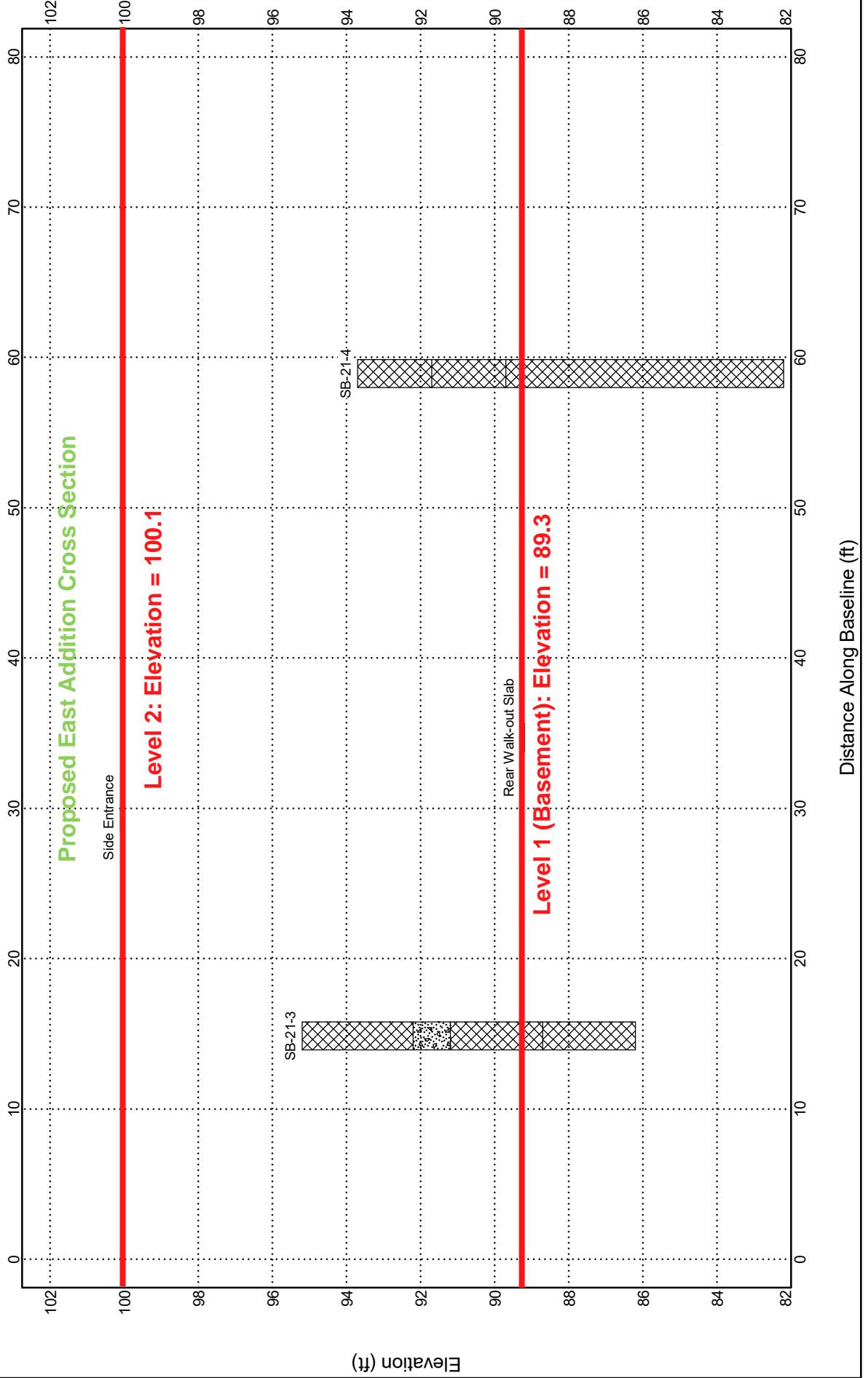
## **BORING CROSS-SECTIONS**

CLIENT DSGW

PROJECT NUMBER 21G1524

PROJECT NAME Safe Haven Addition

PROJECT LOCATION Duluth, MN



# SUBSURFACE DIAGRAM

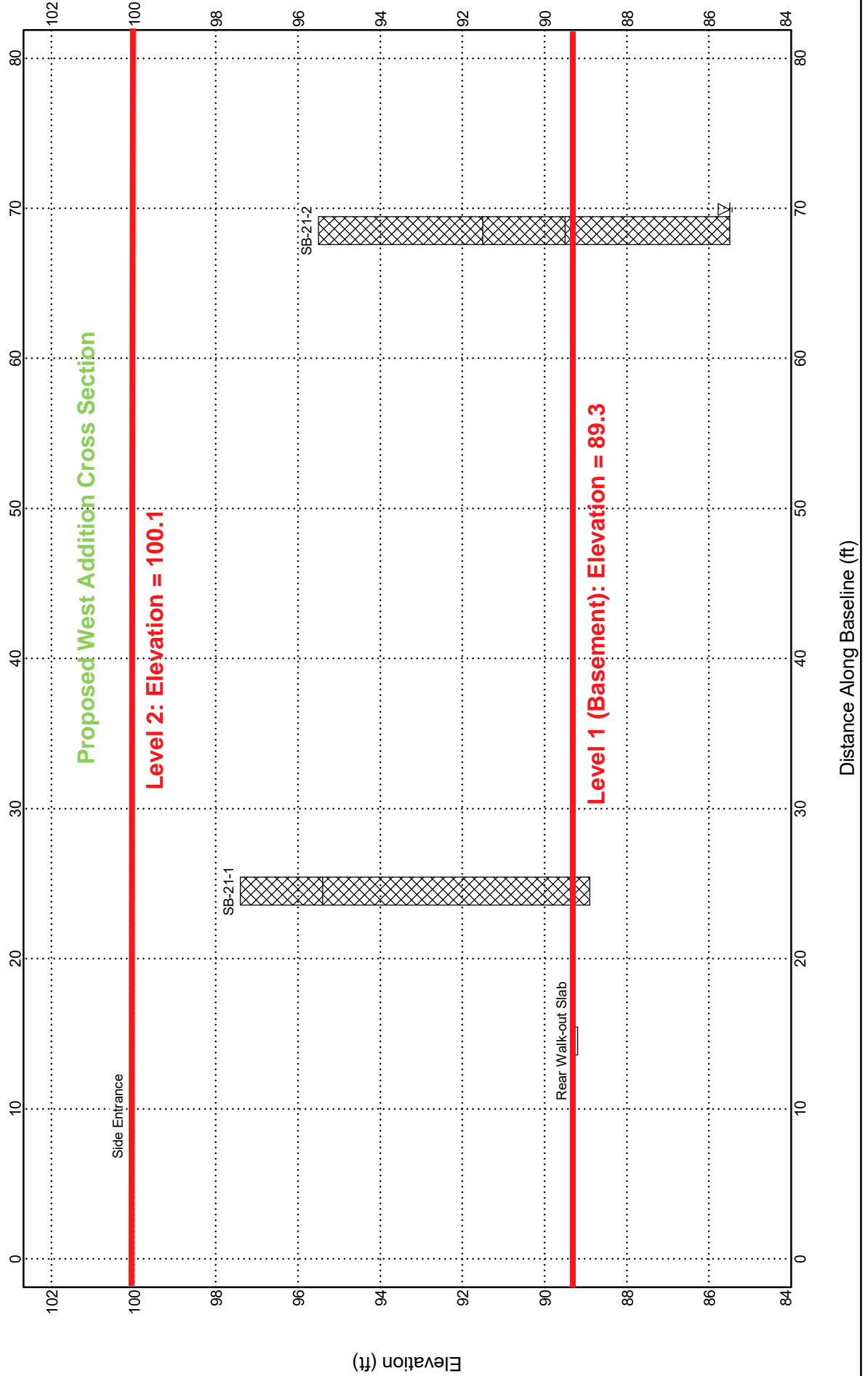
**EPC Engineering & Testing**  
Geotechnical • Environmental • Materials Engineering  
539 Garfield Avenue  
Duluth, Minnesota 55802

CLIENT DSGW

PROJECT NUMBER 21G1524

PROJECT NAME Safe Haven Addition

PROJECT LOCATION Duluth, MN





**SECTION 00 72 00  
GENERAL CONDITIONS**

**FORM OF GENERAL CONDITIONS**

**1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS INCLUDED BY REFERENCE. A COPY OF THE GENERAL CONDITIONS IS ON FILE AT THE OFFICE OF THE ARCHITECT FOR THOSE WISHING TO VIEW IT.**

**RELATED REQUIREMENTS**

**2.01 AIA DOCUMENT A201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, 2017 EDITION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR.**

**SUPPLEMENTARY CONDITIONS**

**3.01 REFER TO DOCUMENT 00 73 00 FOR AMENDMENTS TO THESE GENERAL CONDITIONS.**

**END OF DOCUMENT**



**SECTION 00 73 00  
SUPPLEMENTARY CONDITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

**1.02 THESE SUPPLEMENTARY CONDITIONS AMEND AND SUPPLEMENT THE GENERAL CONDITIONS DEFINED IN DOCUMENT 00 72 00 AND OTHER PROVISIONS OF THE CONTRACT DOCUMENTS AS INDICATED BELOW. ALL PROVISIONS THAT ARE NOT SO AMENDED OR SUPPLEMENTED REMAIN IN FULL FORCE AND EFFECT.**

**1.03 THE TERMS USED IN THESE SUPPLEMENTARY CONDITIONS THAT ARE DEFINED IN THE GENERAL CONDITIONS HAVE THE MEANINGS ASSIGNED TO THEM IN THE GENERAL CONDITIONS.**

**1.04 MODIFICATIONS TO GENERAL CONDITIONS**

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**MODIFICATIONS TO AIA A201**

**4.01 ARTICLE 1.1.1 - THE CONTRACT DOCUMENTS**

- A. Add the following sentence to the end of Subparagraph 1.1.1:
  - 1. The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.

**4.02 ARTICLE 1.2 - CORRELATION AND INTENT OF CONTRACT DOCUMENTS**

- A. Add the following Subparagraph 1.2.4 to Paragraph 1.2:
- B. 1.2.4: If there is an inconsistency in the quality or quantity of Work required by the Contract Documents, the greater quality or quantity of Work indicated shall be provided in accordance with the Architect's interpretation, and no change in the Contract Sum will be permitted.

**4.03 ARTICLE 1.6 - OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE**

- A. Add the following Subparagraph 1.6.2 to Paragraph 1.6:
  - 1. 1.6.2 Contractor's Use of Instruments of Service in Electronic Form.
  - 2. 1.6.2.1 The Architect may, with the concurrence of the Owner, furnish to the Contractor versions of instruments of Service in electronic form. The Contract Documents executed or identified in accordance with Subparagraph 1.5.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.
  - 3. 1.6.2.2 The Contractor shall not transfer or reuse instruments of Service in electronic or machine readable form without prior written consent of the Architect.

**4.04 ARTICLE 4.2 - ARCHITECTS ADMINISTRATION OF THE CONTRACT**

- A. Add clause 4.2.2.1 to Subparagraph 4.2.2:
  - 1. 4.2.2.1 The Contractor shall reimburse the Owner for compensation to the Architect for additional site visits made necessary by the fault, neglect or request of the Contractor.

**4.05 ARTICLE 11.1.2 - CONTRACTORS LIABILITY INSURANCE**

- A. Add the following Clauses 11.1.2.1 through 11.1.2.4 to Subparagraph 11.1.2:
  - 1. 11.1.2.1: The limits for Worker's Compensation and Employers' Liability insurance shall meet statutory limits mandated by State and Federal Laws. If (1) limits in excess of those required by statute are to be provided or (2) the employer is not statutorily bound to obtain such insurance coverage or (3) additional coverages are required, additional coverages and limits for such insurance shall be as follows:

2. 11.1.2.2: The limits for Commercial General Liability insurance including coverage for Premises-Operations, Independent Contractors' Protective, Products -Completed Operations, Contractual Liability, Personal Injury and Broad Form Property Damage (including coverage for Explosion, Collapse, and Underground Hazards) shall be as follows:
  - a. \$1,000,000 Each Occurrence
  - b. \$1,000,000 General Aggregate
  - c. \$1,000,000 Personal and Advertising Injury
  - d. \$ 1,000,000 Products-Completed Operations Aggregate
  - e. The policy shall be endorsed to have the General Aggregate apply to this Project only.
  - f. The Contractual Liability Insurance shall include coverage sufficient to meet the obligations in AIA Document A201-1997 under Paragraph 3.18.
  - g. Products and Completed Operations Insurance shall be maintained for a period of at least (1) year(s) after either 90 days following Substantial Completion or final payment whichever is earlier.
3. 11.1.2.3: Automobile Liability insurance (owned, non-owned and hired vehicles) for bodily injury and property damage shall be as follows:
  - a. \$ 1,000,000 Each Accident
4. 11.1.2.4: Umbrella or Excess Liability coverage shall be as follows:

**4.06 ARTICLE 11.1.3 - CONTRACTORS LIABILITY INSURANCE**

- A. Add the following sentence to Subparagraph 11.1.3:
  1. If this insurance is written on a Commercial General Liability policy form, the certificates shall be ACORD form 25-S, completed and supplemented in accordance with AIA Document G715, Instruction Sheet and Supplemental Attachment for ACORD Certificate of Insurance 25-S.

**4.07 ARTICLE 11.5 - PERFORMANCE BOND AND PAYMENT BOND**

- A. Delete Subparagraph 11.5.1 and substitute the following:
  1. 11.5.1: The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100 percent of the Contract Sum.
  2. 11.5.1.1: The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.
  3. 11.5.1.2: The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

**END OF DOCUMENT**



**SECTION 01 10 00**  
**SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: SAFE HAVEN WOMEN'S SHELTER
- B. Architect: DSGW Architects, Inc.
  - 1. 2 West First Street, Suite 201
  - 2. Duluth, MN 55802
  - 3. Phone: 218-727-2626
- C. Structural Engineer:
  - 1. Northland Consulting Engineers, LLP
  - 2. 102 South 21<sup>st</sup> Avenue West, Suite 1
  - 3. Duluth, Minnesota 55806
  - 4. Phone: 218-727-5995
- D. Mechanical Engineer:
  - 1. Hallberg Engineering, Inc.
  - 2. 5051 Miller Trunk Highway, Suite B
  - 3. Duluth, Minnesota 55811
  - 4. Phone: 218-348-4147
- D. Electrical Engineer:
  - 1. Gausman & Moore
  - 2. 501 South Lake Avenue, Suite 210
  - 3. Duluth, Minnesota 55802
  - 4. Phone: 218-302-6566
- D. Civil Engineer:
  - 1. Northern Engineering & Consulting, Inc.
  - 2. 2216 Tod Ct. NW
  - 3. Bemidji, Minnesota 56601
  - 4. Phone: 218-444-4860
- D. Contractor:
  - 1. Boldt
  - 2. 1001 Tall Pine Lane
  - 3. Cloquet, Minnesota 55720
  - 4. Phone: 218-878-4545
- E. The Project consists of the demolition and re-construction of new areas as well as existing areas. Facility is located in Duluth, MN. Construction includes but is not limited to: General requirements, Demolition, Concrete, Masonry, Steel, Carpentry, Thermal Properties, Openings, Finishes, Specialties, Furnishings, Mechanical, Electrical, Plumbing, Civil and Earthwork, etc.

**1.02 CONTRACT DESCRIPTION**

- A. These Specifications with the accompanying Drawings are intended to describe and illustrate all work necessary to carry out the work.
  - 1. Provide labor, materials articles, equipment, incidentals, items, tools, services, supplies, methods, operations, skills in such quantities as may be necessary to complete Project within the intent of the Contract Documents. Singular notations shall be considered plural where plural application is reasonably inferable. Mention or indication of extent of work under any work Division or Specification Section is done only for convenience of Contractor and shall not be construed as describing all work required under that Division or Section.

2. Drawings: The List of Drawing Sheets is included in Section 00 01 15. Contractors and all Subcontractors shall be bound by the information and requirements provided by the complete set of Drawings. Individual Detail Sheets shall be considered with and as a part of the Drawings and the overall Contract Documents.
3. The Divisions and Sections of the Technical Specifications primarily apply to the various trade divisions, but Contractor and all Subcontractors shall be bound to the information and requirements of the complete set of Specifications.
4. Other Requirements: The requirements of all Sections of Divisions 00 and 01 apply to and shall govern the Contractor and all Subcontractors for this Project. Supplementary General Conditions and all Sections Division 01 shall govern Work of all technical Sections. Where provisions and requirements are referred to as the responsibility of the Contractor or a particular Subcontractor, he shall have the primary responsibility to accomplish, provide, assume, and enforce, but the Contractor and all Subcontractors shall be governed by the requirements and cooperate fully in fulfilling the requirements.
5. Examination of Site and Documents: In submitting a bid and in accepting a Contract award, the Contractor represents he has examined the site, existing conditions as well as the entire set of documents, in accordance with the General Conditions and agrees to be bound by all conditions of the site, existing conditions, and all documents, without additional cost.

### **1.03 WORK BY OWNER**

- A. Refer also to document 00 72 00, General Conditions.
- B. The Owner reserves the right to let other contracts in connection with this Project. This Contractor shall afford other contractor's reasonable opportunity for the introduction and storage of their materials and execution of their work, and shall properly connect and coordinate his work with theirs.
- C. The Owner reserves the right to jointly occupy the premises with the Contractor in the performance of his duties and functions. The Owner also reserves the right to: enter into the Project and premises at all times; make installations of materials and equipment at appropriate times as the Work progresses; install equipment, furniture, and furnishings when spaces are at appropriate stages of completion. Contractor shall coordinate work with the Owner and cooperate with the Owner to minimize undue interferences.
- D. If any part, unit, phase, or the entire Project is substantially complete or ready for occupancy, the Owner may, upon notice to the Contractor, and without prejudice to any of the rights of the Owner or Contractors, enter into and make use of the Work that is substantially complete.

### **1.04 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

### **1.05 CONTRACTOR USE OF SITE AND PREMISES**

- A. Do not infringe on areas outside of the established construction limits indicated on Drawings or designated by the Owner without permission of the Owner. Arrange temporary easements which may be required for construction operations, maintain safety precautions, and return to original conditions upon completion of the Contract. The Owner may caution Contractor about conditions which they observe, but shall not be held responsible to provide such advice or for enforcing any protection.
- B. Contractors and all other persons connected with this project shall only use parking areas approved.
- C. Contractors shall use and maintain in clean condition site access route as designated. No other access shall be used for vehicles or men.
- D. Move any stored products which interfere with operations of Owner or other Contractors.

- E. Do not load structures with weights which will endanger the structure.
- F. Maintain site in safe condition and keep free of construction materials and debris.
- G. Maintain fire protection and access at all times. Permit immediate access by fire fighting equipment.
- H. Hazardous Protection: Warning signals, barricades and other protective measures for hazard shall be in place or operate 24 hours per day.
- I. The Contractor shall do all patching of existing property on or adjacent to the site, including but not limited to: walks, pavements, roadways, structures, and utilities which are cut or damaged by construction and are not designated for removal, relocation or replacement in the course of the construction.
- J. Work occurring on public property shall be constructed in accordance with all laws, ordinances, rules, regulations and orders of any public authority having jurisdiction.
- K. Site Management Requirements:
  - 1. The Prime Contractor shall coordinate all work on site with the Owner and Architect.
  - 2. General: Upon commencement of the Work at the site, the Prime Contractor shall assume the site management at areas within construction limits as agreed to by the Owner and Contractor, other areas where work is to be performed and adjacent storage areas, to provide proper direction to all contractors, subcontractors and workmen. Site management shall be coordinated with the Owner and shall include maintaining areas as specified and required to be free of construction activity, parking and storage where it is necessary to provide clear access and areas for the Owner's functions.
  - 3. Responsibilities: Site management and maintenance shall include, but not be limited to: enforcement of access, parking, delivery, storage, noise and other restrictions; maintenance of fences in good condition; providing and maintaining temporary facilities as specified; dewatering the excavations, except water in trenches and excavations made by subcontractors solely for their own work; protection of adjacent structures as may be damaged caused by water; overall fire and safety management; protection for site features to remain; temporary partitions, closures, dust barriers and similar to separate work areas in existing building spaces; and similar overall or general management of the site and adjacent public and other property to fulfill the obligations of this Contract.
  - 4. Fencing: Refer to Section 01 50 00 for fencing to be provided at areas of construction and storage.
  - 5. Use of Streets: Where the conduct of the work requires the obstruction or use of a roadway or parking lot, it shall be the responsibility of the respective Contractor to secure all necessary permission from the Owner. Contractors shall be responsible for the protection of the public in the vicinity of the work and nothing in these specifications shall be construed to relieve him of said responsibility. Protective devices shall conform to the requirements of the Highway Department having jurisdiction and/or the proper public authorities and shall be installed as required by the Owner.
- L. Provide access to and from site as required by law and by Owner:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.

#### **1.06 WORK SEQUENCE**

- A. Begin work when scheduled by general contractor to achieve substantial completion as scheduled to prevent delay in the work by others.
- B. Deviations in the schedule must be authorized by the architect and owner.

- C. Time Set by Schedule: Where the constraints, completion and timing of Work specified in this or other Sections do not have specific dates or time imposed by the Contract Documents, they shall be considered and incorporated as established dates in the final Construction Schedule of the Prime Contractor. Where the activity affects the Owner, the time or dates established in the construction schedule shall be maintained, as the Owner will plan his activities accordingly.
- D. Other Considerations: In addition to the time of commencement, substantial completion and final completion dates, all other events, fasteners, and constraints shall be carefully considered in establishing the work program and schedule of the Project. The Contractor and subcontractors shall work closely in timing of operations and shall have materials, equipment and other elements ready to be able to immediately fulfill their obligations in the overall schedule.
- E. Final Completion: Within 10 days after substantial completion.
- F. Time of Completion:
  - 1. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will ensure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
  - 2. Delays and Extension of Time: All time limits stated in the Contract Documents are of the essence of the Contract. The Contractor may be granted an extension of time and/or relief of Liquidated Damages because of causes beyond the Contractor's control which constitute a justifiable delay. The Owner will extend the time subject to the following provisions:
    - a. Claims for extension of time shall be made per Article 8 of the GENERAL CONDITIONS.
    - b. Written notice of the delay, an explanation of the cause and an estimate of the length of delay shall be forwarded to the Architect within five days of the beginning of such delay.
    - c. Claims for extension of time shall be stated in numbers of whole calendar days. The actual dates on which the delay(s) occurred must be stated. In the case of claims for extension of time because unusual inclement weather prevented the execution of major items of the Work on normal working days, calendar days shall be computed by multiplying normal work days (five days per week) by a factor of 1.4. Contractor must provide documentation of all weather related delays and claims for the extension will be allowed only if the weather is distinctly out of line with the ten year average.
    - d. Any claim for extension of time for strikes or lockouts shall be supported by a situation of facts concerning the strike, including but not limited to, the dates, the craft concerned, the reason for the strike, efforts to resolve the dispute, and efforts to minimize the impact of the strike in progress.
    - e. Any claims for extension of time for delays in transportation or for failure of suppliers shall be supported by a citation of facts demonstrating that the delays are beyond the Contractor's control, including, but not limited to, his efforts to overcome such delays.
    - f. The time extensions for changes in the Work will depend upon the extent, if any, by which the changes cause delay in the completion of various elements of construction.
    - g. A Change Order granting the time extension may provide that the Contract Completion Date will be extended only for those specific elements so delayed and that the remaining work will not be altered. Further, the amended completion date shall be of essence to this contract and shall be subject to the same conditions as the original completion time.

3. Project Schedule:
  - a. General: The General Contractor shall prepare the Final Contractors Construction Schedule for the Work. The location and nature of the Project, the requirement to maintain the operation, functions, and services of the Owner dictates careful planning, scheduling and close cooperation between the Contractor, subcontractors and the Owner. The Contractor shall keep the Owner advised of his intended operations and schedule and be guided by other constraints or timing of work that may develop during construction. It is the intent of the Owner to cooperate as far as possible to minimize hampering of operations and the Contractor may suggest schedules and timing which will facilitate progress.
  - b. Within ten work days after award of the Contract, prepare, submit and review with the Owner and Architect a detailed schedule addressing work activities and estimate duration of the activities. This schedule shall be prepared in such detail and form as the Architect may require and will be subject to the Approval of the Architect and Owner.
  - c. In general, the schedule shall indicate the various phases of work coordinated and integrated time-wise with the other work. The schedule shall also indicate the various activities of each of the areas, stages, and phases of work, with integrated and coordinated commencement and completion times. After review by the Owner, including any revised sequencing proposed by the Contractor or Owner to improve the progress or minimize the disruption of the Owner's functions, the Contractor shall revise the schedule as the "final" schedule, which will provide the planning information for the Owner's relocation and other operations.
  - d. Submit schedule updates and Material Status Report updates with applications of payments as requested by the Architect.
  - e. Furnish manpower staffing information as requested by the Owner or Architect.
  - f. Coordinate the letting of subcontracts, material purchases, shop drawings submissions, delivery of materials, sequence of operations, etc., to conform to the Project Schedule and furnish proof of same as may be required by the Architect.
  - g. Revise and periodically update the Project Schedule as necessary to conform to the current status of the project and furnish copies to the Owner, Architect, and subcontractors.
4. Commencement of Work:
  - a. No Contractor shall commence Work nor allow any Subcontractor or Sub-subcontractor to commence the Work until:
    - 1) The Contract has been fully executed; and the Owner, has issued a Notice to Proceed.
    - 2) The Owner has approved the Contractor's Performance and Payment Bonds.
    - 3) The Owner has approved evidence of the Contractor's Liability Insurance and any other insurance required to be purchased by the Contractor.
5. Layout of the Work:
  - a. The PRIME CONTRACTOR shall be responsible for and shall assist Subcontractors and Prime Trade Contractors in the location of walls, partitions, columns, beams, floors, ceilings, and openings therein where their work must be located and placed prior to the erection of these items.
  - b. The Contractor and/or Subcontractor is responsible for the accuracy with respect to layout of his work. Immediately report any perceived discrepancies or errors in the Drawings to the Architect and make adjustments in accordance with instructions given by the Architect.

- c. The contractor and subcontractor shall recognize that the drawings necessarily are diagrammatic in many instances. All work and in particular exposed piping, ducts, conduit and similar items shall be neatly and carefully laid out to provide the most useful space utilization and the most orderly appearance. Piping and similar work shall be installed as close to ceilings and walls as conditions permit, located to prevent interference with other work or with the use of the spaces in the manner required by the functions of the room and staff. Valves shall be located in inconspicuous but accessible places. Before proceeding with any work, particularly where exposed, the Contractor shall carefully plan the layout and review it with the Architect for acceptability of location.
6. Openings, Blocking, Backing and Grounds:
- a. Each Trade Contractor shall be responsible for providing backing and grounds in all walls and above ceilings necessary for the installation of all contracted work.
  - b. Make suitable preparations for the hangers, inserts, anchors, grounds and supports that are to be embedded in concrete, masonry walls, floors, partitions or structural members, or that are to pass through or be attached thereto. Provide and install proper sleeves, boxes, receptacles or chases for all openings or recesses to receive work occurring in or passing through any such members, all of which shall be located accurately and secured firmly in place before any such masonry has been erected, concrete poured or walls/ceilings enclosed.
7. Field Dimensions: The need to obtain accurate field dimensions in ample time to permit fabrication of materials and equipment, for delivery and installation in accordance with the schedule, shall be recognized. Each Contractor and all subcontractors shall cooperate in completing work phases to accommodate the schedule for obtaining dimensions and to prevent fabrication delay. In the event it is impractical to have work in place to permit field dimensions, the Contractor shall guarantee necessary dimensions, before construction, to the various fabricators and be responsible to insure the dimensions.
8. Reference to Standards and Codes:
- a. Notice of Variance: If a Contractor observes that the drawings and specifications are at variance with any applicable code or regulation of a governmental unit having authority, he shall promptly notify the Architect in writing, and any necessary changes shall be adjusted as provided in the Contract for Changes in the Work. If a Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, he shall bear all costs and damages arising therefrom.
  - b. Reference Standards: For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes and other standards.
  - c. Effect of Standards: The standards referred to, such as ASTM, Federal Specifications, NFPA and similar standards, shall have full force and effect as though printed in the Specifications, except as modified in the Specification. These standards are not furnished to bidders and Contractors as it is assumed that these standards are readily available and that the manufacturers and trades involved are familiar with their requirements.
  - d. Date of Standard: Any material specified by reference to the number, symbol or title of a specific standard, such as ASTM, Commercial Standard, a Federal Specification, a trade association standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Contract Documents, unless otherwise noted.

- e. Certificate: For products specified in accordance with a Federal Specification, ASTM Standard, American National Standards Institute or similar association standards, upon request the Contractor shall provide an acceptable affidavit by independent testing laboratory or other source approved by the Architect, certifying that product furnished for this Project complies with the particular standard specifications. Where necessary, requested or specified, supporting test data shall be submit to substantiate compliance. The manufacturer is subject to Architect's acceptance.
9. Coordination Requirements:
- a. General: The nature of the Project makes it imperative the Contractor and all subcontractors and prime trade contractors coordinate their work and cooperate with each other and the Owner from the start of the Project to completion. PRIME CONTRACTOR shall be the Prime Coordinator for the Project and shall establish the overall schedule for the progress of the Project, the sequence of completion and general use of the site.
  - b. Off-Site Fabrication: With the restricted site, off site fabrication is encouraged as much as possible and schedule of deliveries so materials and equipment can be installed immediately after delivery. The Project Coordination Administrator shall alert and advise subcontractors and suppliers of the need to hold deliveries until they are notified the materials are required on the site.
  - c. Equipment: With respect to mechanical and electrical features of equipment, complete data must be exchanged directly between the Contractors and subcontractors involved as the progress of the Project requires. The person requesting the information shall advise when it will be required. The suppliers of equipment are expressly required to provide large scale layout drawings showing the required rough-in locations of all services (dimensioned from building features) service characteristics. In the event of incorrect, incomplete, delayed or improperly identified information, the party causing the delay or error shall be responsible and pay for any modifications or replacements necessary to provide a correct, proper and new installation, including relocations required.

#### **1.07 GENERAL PROTECTION AND SAFETY**

- A. General: In accordance with best construction practices, the Prime Contractor shall be responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the Work. This requirement shall apply continuously 24 hours per day until acceptance of the Work by the Owner and shall not be limited to normal working hours.

#### **1.08 PHOTOGRAPHS / PRESS RELEASES**

- A. Do not take, or cause any photographs to be taken at the job site without prior approval of the Owner / Architect.
- B. Do not issue any press releases or disseminate information concerning the project to the news media without prior approval of the Owner / Architect.

#### **1.09 WORKING HOURS**

- A. This project shall be scheduled by the Prime Contractor to operate on a 5-day, 40-hour per week basis. Contractors employing trades who work other than the above hours must provide for coordination of their work as it relates to the work of other trades which work the above hours at no additional cost to the Owner. This schedule may be changed or modified with the approval of the Owner / Architect.

#### **1.10 HAZARDOUS MATERIAL REMOVAL**

- A. If during the construction of the Project hazardous material is suspected or encountered by the Contractor, the Contractor shall promptly notify the Architect and the Owner, with their own forces or by separate contract, shall be responsible for complete removal and disposition of the hazardous material.

- B. If the Contractor claims that delay and additional cost is involved because of this action, they shall make claim as provided elsewhere in the Contract Documents.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 20 00  
PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 72 00 - General Conditions and Document 00 73 00 - Supplementary Conditions: Additional requirements for progress payments, final payment, changes in the Work.

**1.03 SCHEDULE OF VALUES**

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in triplicate within 15 days after date of Owner-Contractor Agreement.
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization and bonds and insurance.
- E. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- F. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- G. Revise schedule to list approved Change Orders, with each Application For Payment.

**1.04 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Execute certification by signature of authorized officer.
- E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
- F. Round off all figures on all progress payments to the nearest dollar, any adjustment required shall be made on the final application for payment.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- H. Submit three copies of each Application for Payment. Upon review and approval, the Architect will sign and forward three (3) copies to the Owner with their recommendations.
- I. Include the following with the application:
  - 1. Affidavits attesting to off-site stored products.
    - a. No payment will be made to a contractor on account of materials and equipment in transit or stored at off site locations unless prior approval is received from the Owner and Architect. Proof of proper insurance must be submitted for materials stored of site before approval will be considered.

2. Lien Waivers: Will be required for each payment request by each Contractor and Subcontractor. First lien waivers to be submitted with Payment Request No. 2 covering payment for Payment Request No. 1. They shall then continue with subsequent payment requests covering the preceding payment.
    - a. With submission of the final payment request, or upon request for reduction of retainage, the Contractor shall provide lien waivers from all subcontractors and suppliers covering all dollar amounts for which a lien waiver has not yet been submitted.
  3. Payroll Records: Will be required for each pay request by each Contractor and Subcontractor carrying out work on the site. Each application for payment submitted shall be accompanied by payroll records current to within twenty-one (21) days of the date of the application.
    - a. Final payment to a contractor will not be made until payroll records are submitted covering completed project.
- J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

#### **1.05 RETAINAGE**

- A. To ensure the proper performance of the Contract, the Owner will retain FIVE PERCENT of the amount of each Certificate for Payment issued by the Architect. Such amount will be retained by the Owner until Substantial Completion. At substantial completion the withholding amount will be reduced to Two Percent.
- B. In event of a very minor amount of work, incomplete or not corrected due to weather, unsuitable conditions for testing or similar conditions preventing the General Contractor from proceeding, the retained amount may be reduced to three times the value of the incomplete work upon recommendation of the Architect and approved by the Owner.

#### **1.06 MODIFICATION PROCEDURES**

- A. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 10 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 60 00.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
  3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.

4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
  1. Provide following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  2. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Percentages allowed for Overhead and Profit shall be as listed in the Supplementary General Conditions, Section 00 73 00.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

#### **1.07 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  1. All closeout procedures specified in Section 01 70 00.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 30 00**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Coordination drawings.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 72 00 - General Conditions: Dates for applications for payment.
- B. Section 00 73 00 - Supplementary Conditions: Duties of the General Contractor.
- C. Section 01 10 00 - Summary: Stages of the Work, Work covered by each contract, occupancy.
- D. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- E. Section 01 78 00 - Closeout Submittals: Project record documents.

**1.03 PROJECT COORDINATION**

- A. Project Coordinator: Contractor.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
  - 1. Requests for interpretation.
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.

- B. Attendance Required:
  1. Owner.
  2. Architect.
  3. Contractor.
- C. Agenda:
  1. Execution of Owner- Contractor Agreement.
  2. Submission of executed bonds and insurance certificates.
  3. Distribution of Contract Documents.
  4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
  5. Designation of personnel representing the parties to Contract and Architect.
  6. Designation of personnel representing the parties to Contract, General Contractor, Major Subcontractors, Owner and Architect.
  7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  8. Rules and regulations governing performance of Work.
  9. Procedures for safety and first aid, security, quality control housekeeping, and other related matters.
  10. Scheduling.
  11. Any additional Owner or Architect/Engineer requirements.
- D. Record minutes and distribute electronic copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

### **3.02 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
  1. Contractor.
  2. Owner.
  3. Architect.
  4. Contractor's Superintendent.
  5. Major Subcontractors.
- D. Agenda:
  1. Review minutes of previous meetings.
  2. Review of Work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Review of off-site fabrication and delivery schedules.
  7. Maintenance of progress schedule.
  8. Corrective measures to regain projected schedules.
  9. Planned progress during succeeding work period.
  10. Maintenance of quality and work standards.
  11. Effect of proposed changes on progress schedule and coordination.
  12. Other business relating to Work.
- E. Record minutes and distribute electronic copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 PRE-INSTALLATION CONFERENCES**

- A. When required in individual specification section, the Architect shall convene a pre-installation conference at work site prior to commencing work of the Section. When possible, this shall be scheduled to coincide with a regular progress meeting.
- B. Attendance will be required by all parties directly affecting, or affected by, work of the specific Section.
- C. Notify all parties seven days in advance of meeting date.
- D. The Architect shall, preside at conference, record minutes, and distribute electronic copies to all participants.
- E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

### **3.04 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

### **3.05 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them electronically for review:
  - 1. Product data.
  - 2. Shop drawings.
  - 3. Samples for selection (hard copies required).
  - 4. Samples for verification (hard copies required).
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. Allow for at least two weeks review of submittals to avoid delay of work.
- E. Include with submittal preparation, field construction criteria, verification of catalog numbers and similar data, and coordination of Work requirements and Contract Documents.
- F. Make all submittals to the Architect through the project coordination administrator unless specified otherwise.
- G. After review, provide electronic copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

### **3.06 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions.
  - 6. Manufacturer's field reports.
  - 7. Other types indicated.

- B. No shop drawings of equipment brochures, cuts of fixtures, etc. Such copies of standard manufactured items in the form of manufacturer's catalog sheets showing sizes, dimensions, performance characteristics, capacities, clearances, wiring diagrams, and shall be furnished electronically unless otherwise specified. Copies will be stamped, and electronic copies will be returned to the Project Coordination Administrator for distribution to the subcontractor or supplier. If notations and marks indicate that revised information is required before shop fabrications (or other work represented) can proceed, revised or corrected information shall be submitted.
- C. Unless otherwise specified, submit to the Architect two representative samples of size and nature representing typical qualities. Where required, submit a sufficient number of samples to demonstrate the complete range of variations of the material or quality. Written acceptance of the Architect is required prior to ordering any item for which samples are required.
- D. Submit samples to Architect securely packaged, with the name of the Project clearly indicated on the package exterior. Firmly attach a label or tag to the sample, with the following information: a) Name of Project; b) Name of Supplier; 3) Name of Trade Contractor, and, d) Product information such as manufacturer's designation, finish, type, class, grade, etc., as is appropriate.
- E. Erect field samples and mock-ups at the project site, unless otherwise specified in the Contract Documents, at a location acceptable to the Project Coordination Administrator, Architect and Owner.
- F. Review of shop drawings, product data and samples by the Architect or their consultant does not relieve the Contractor, Subcontractor or Supplier of responsibility for compliance with the Contract Documents, confirming and correlating quantities and dimensions, selecting fabrication processes and techniques of construction, coordination of the work represented by each submittal with other trades, performing the work in a safe and satisfactory manner, compliance with the Project Schedule and all other provisions of the agreements.
- G. The Architect's/Engineer's notation on the submittals is not an authorization for additional work or additional cost. If any notations represent a change to the Contract Sum, submit a cost proposal to the Architect, through the Project Coordination Administrator for the change in accordance with the procedures specified before proceeding with the work. Notify the Project Coordination Administrator by letter within five days of returned submittal. Resolve such issues before proceeding with the work.
- H. The Contractor, Subcontractor or supplier shall not begin fabrication until all specified submittal procedures have been fulfilled.
- I. In order to guarantee the delivery of materials for timely completion of the work, and to relieve the Contractor of direct responsibility in the event of materials shortages or transportation delays, the Supplier shall, within two (2) weeks after the receipt of Notice to Proceed, furnish to the Architect, confirmed orders showing the anticipated date of delivery to the site, for materials for all of the principle parts of the work and for such others as the Architect/Engineer or Owner may direct.
- J. In addition to Warranty provisions of the General Conditions, provide all extended warranties, bonds and service contracts as required by individual specification sections.
- K. Assemble and submit to the Architect warranties, bonds, and service and maintenance contracts as specified in the respective section of the Specifications. In conjunction with the submittals of Section 01 78 00, the table of contents for this submittal shall include the product of work item, the form, with the name of the principal, address and telephone number, scope, date of beginning of the warranty, bond or service maintenance contract, duration, information for the Owner's personnel providing the proper procedure in case of a failure and instances which might affect the validity of the warranty or bond.
- L. The beginning date of the warranty will be the date that the project is substantially completed.
- M. Reports of inspections, tests and approvals required by the Contract Documents shall be submitted to the Architect, through the Project Coordination Administrator, electronically.



- N. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

### **3.07 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

### **3.08 ELECTRONIC SUBMITTALS**

- A. Documents for Review:
  - 1. Transmit electronic copies of each shop drawing (structural, mechanical and electrical) to Project Coordination Administrator.
    - a. The Project Coordination Administrator shall generally review shop drawings for compliance with the Drawings and Specification.
    - b. Electronic prints of shop drawings individually stamped by Project Coordination Administrator will be sent to Architect for review.
  - 2. Architect or their consultant will review all shop drawings and will return electronic copies to the Project Coordination Administrator stamped to indicate action taken.
    - a. Electronic copies of any shop drawings that are not satisfactory to the Architect or his consultant will be returned to the Project Coordination Administrator for necessary revision and resubmittal.
    - b. Electronic copies of shop drawings that do not require major revisions, will have corrections, if any, noted, and will be stamped to indicate Architect's action.
- B. Documents for Information: Submit electronic copies.
- C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.09 SUBMITTAL PROCEDURES**

- A. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
  - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- B. Transmit each submittal with a copy of approved submittal form.
- C. Transmit each submittal with letter of transmittal.
- D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

- G. Deliver submittals to Architect at business address.
- H. Schedule submittals to expedite the Project, and coordinate submission of related items.
- I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- K. Provide space for Contractor and Architect review stamps.
- L. When revised for resubmission, identify all changes made since previous submission.
- M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- N. Submittals not requested will not be recognized or processed.

**END OF SECTION**

**SECTION 01 40 00**  
**QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Submittals.
- B. Control of installation.
- C. Tolerances.
- D. Testing and inspection services.
- E. Manufacturers' field services.

**1.02 REFERENCE STANDARDS**

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
- B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2014a.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Test Reports: After each test/inspection, promptly submit electronic copies of report to Architect and to Contractor.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Conformance with Contract Documents.
    - k. When requested by Architect, provide interpretation of results.
  - 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
  - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
  - 1. Submit report in duplicate within 30 days of observation to Architect for information.
  - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
  - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
  - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

#### **1.04 REFERENCES AND STANDARDS**

#### **1.05 TESTING AND INSPECTION AGENCIES**

- A. Owner will employ and pay for services of an independent testing agency to perform specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

### **PART 3 EXECUTION**

#### **2.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

#### **2.02 TOLERANCES**

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

#### **2.03 TESTING AND INSPECTION**

- A. Testing Agency Duties:
  - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 2. Perform specified sampling and testing of products in accordance with specified standards.

3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
  5. Perform additional tests and inspections required by Architect.
  6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  2. Agency may not approve or accept any portion of the Work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

#### **2.04 MANUFACTURERS' FIELD SERVICES**

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

#### **2.05 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

**END OF SECTION**



**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

**1.02 TEMPORARY UTILITIES**

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. Temporary Light and Power:
  - 1. Prime Contractor Responsibilities:
    - a. The Prime Contractor shall coordinate temporary light and power during construction phases of the project.
    - b. The Prime Contractor shall pay for all electrical energy used.
    - c. Coordinate with the sitework contractor.
  - 2. Electrical Sub-Contractor responsibilities:
    - a. Provide temporary ties into an existing panel/panels within the general proximity of the remodeling and new construction.
    - b. Provide at least one 20 amp., 120 volt, temporary branch circuit with three grounding, duplex receptacles for each 7500 sq. ft. of floor area. Locate receptacles so that extension cords will not exceed 100 feet in length. The temporary branch circuits may be used for portable tools, portable lights and other small power loads.
    - c. Provide at least one 200 watt incandescent lamp, or the equivalent lighting for each 625 sq. ft. of floor area with at least one light in each room. Provide additional lights in corridors and stairwells as necessary to provide adequate illumination. Furnish all light bulbs for the temporary lighting system.
    - d. Maintain the temporary electrical service and lighting during the normal work week which is defined as five days a week, including one-half hour before regular working hours and one-half after regular working hours for each trade. (10 hours per day)
    - e. Remove the temporary light and power system and the temporary service terminals when no longer required, and repair any damage caused by the temporary system.
  - 3. Separate Contractor/Subcontractor responsibilities:
    - a. If 3-phase power or voltage higher than 120 volts is required, provide the necessary temporary wiring, and pay the cost thereof. Coordinate installation with Electrical Contractor.
    - b. Do not use the temporary light and power system for electric welders, hoists, or heating.
    - c. Maintain temporary electrical service and lighting if used beyond the normal work week.
    - d. Each subcontractor shall make arrangements and pay the costs for electrical service, lighting and power for his field office, storage sheds, and other temporary buildings.
    - e. Each Sub-Contractor shall furnish extension cords and contractors requiring supplemental lights shall furnish their own portable lights.

4. Use of permanent electrical system: when installation of the permanent electric system is sufficiently complete to be operated safely and system may be used to provide construction light and power, and testing and operating of permanent equipment.
  5. Permanent light and power: The Owner will assume the responsibility and pay the costs of providing electrical light and power including the energy cost on the date of his occupancy or the date of Substantial Completion of the Project, whichever is sooner.
- C. Water:
1. Water is available at the site for use by the Contractor. Contractors shall make every effort to conserve the use of water.
  2. Water consumption cost will be paid by the Owner.
  3. Until such time as the permanent water service utilities are provided to the site EACH TRADE CONTRACTOR shall provide all water required to carry out the work of their contract.
  4. After permanent water supply is in place, the General Contractor shall make arrangements for a supply of water as required and water consumption cost will be paid by the General Contractor.
  5. Contractors/Subcontractors are responsible for providing their own hoses to bring water from the temporary water source to their work areas. Only heavy duty 3/4" hose in good condition will be permitted. The discharge end of each hose will be equipped with a means of positive shut-off. Do not use hoses which leak at connections or elsewhere throughout their length. Disconnect all hoses from hose bibs when not in use and before the end of the work day.
  6. Each Contractor/Subcontractor shall provide remote sanitary drinking water dispensers for use of their own personnel, convenient of work stations.
  7. Those using the water shall protect or remove water supply during freezing temperatures.

#### **1.03 CONSTRUCTION HEAT PRIOR TO ENCLOSURE**

- A. It is not anticipated that construction heat will be required prior to enclosure of the project.
- B. Adhere to the approved Project Schedule, regardless of weather conditions, during the period when work is scheduled to be performed. All required work and the cost thereof to meet this obligation will be included in the Contractor's base proposal and in the resulting Contract Sum. No claim for an extension of Contract Time, or for an increase in Contract Sum will be honored by the Owner, if such claim is based upon the cost of providing construction heat as specified above.
- C. Each Contractor or Subcontractor to be responsible for providing temporary weather-tight enclosures as approved by the Owner and Architect, as work progresses, and as necessary to provide acceptable working conditions to accomplish their work without causing a delay in the project.

#### **1.04 CONSTRUCTION HEAT AFTER ENCLOSURE**

- A. For construction heat purposes, the building or portion thereof will be declared enclosed when all enclosing walls are erected, roof or floor construction above is installed, and all doors, windows, or openings in the exterior walls are covered.
- B. After enclosure, if required, the General Contractor shall provide, operate, and maintain a temporary system for heating the enclosed area of the building. This system shall consist of direct fired L.P. gas, temporary heat units or other devices as required to maintain the specified temperatures.
- C. After enclosure of the building, a minimum temperature of 50 degrees F. shall be maintained at all times. During the placing of interior millwork, resilient flooring, acoustic tile, ceramic tile, plaster, painting and decorating, and similar finish materials, and continuing until the Owner assumes responsibility for heating the building, the minimum temperature shall be 60 degrees F. It shall be the responsibility of each Contractor to coordinate with the General Contractor to assure that all temporary enclosures remain in the closed position.



- D. The General Contractor shall arrange for the ventilation of enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, and gases.
- E. This temporary heating and ventilation shall remain in place until the permanent heating and ventilation systems are installed, including ductwork.

**1.05 USE OF PERMANENT HEATING AND VENTILATING SYSTEMS:**

- A. If required, the General Contractor and the Heating Contractor shall operate and maintain the equipment during its use for temporary heating.
- B. The cost of fuel and utilities used in the operation of the permanent heating system will be paid for by General Contractor.
- C. Warranties shall begin upon Substantial Completion.
- D. The permanent system shall be operated, after final review and acceptance, with a full complement of disposable filters which shall be replaced by the Mechanical Contractor upon completion of the project.

**1.06 VENTILATION**

- A. The General Contractor shall arrange for the ventilation of enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, and gases.

**1.07 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. The General Contractor shall provide and maintain telephone service within his office for his own use and use by all contractors, subcontractors, and representatives of the Owner and the Architect. Toll charges shall be paid by the party initiating the call using credit cards, watts lines or reverse charges.
- C. Each contractor shall be responsible for installation, payment of charges, and removal of any telephone he may require in his office or storage trailer.
- D. Use of cellular phones will be permitted.
- E. Telecommunications services shall include:

**1.08 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.
- C. The Prime Contractor shall provide & maintain one or more portable "Satellite type" temporary toilets convenient to each major area of construction, for the use of all Contractors, subcontractors, their personnel and employees.
- D. Permanent toilet facilities are not to be used by construction personnel.

**1.09 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Each Contractor shall furnish and maintain all necessary informational signs required to help maintain the safety and health at the work site such as "Danger" "High Voltage", etc.
- C. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

### **1.10 FENCING**

- A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

### **1.11 EXTERIOR ENCLOSURES**

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

### **1.12 INTERIOR ENCLOSURES**

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

### **1.13 CONSTRUCTION ACCESS AND BARRIERS**

- A. Each Contractor shall provide temporary construction access consisting of OSHA approved ladders and/or scaffolding required to carry out the work of their contract. These shall be placed at a location approved by the General Contractor.
- B. Each Contractor and Subcontractor shall provide hoisting facilities for his own use.
- C. Each Contractor shall provide temporary sheeting and shore and brace excavations and new construction as necessary for the safe and proper execution of the Work. Remove temporary supports when backfilling is complete or new construction can safely support the loads.
- D. The General Contractor shall provide protective fences, barricades and lights as required to prevent unauthorized entry to construction areas to meet all safety requirements of OSHA and to protect existing facilities and adjacent properties from damage from their construction operations.
  - 1. Any contractor carrying out excavation or requiring excavations shall protect excavations, trenches, etc. from accidental access by placing protective fencing around openings.
- E. Protective fencing at all excavations shall be provided by the Excavator.
- F. Protective fencing at storage areas shall be provided by the Contractor whose materials require fencing.
- G. Fencing shall be a minimum of 48 inch high snow fence mounted on steel posts not over six feet on center.

### **1.14 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. The General Contractor shall be responsible for security of the building and site. Exterior openings at which work cannot be completed within one working day's time will be closed to prevent entry into existing buildings or new construction.
- C. This shall include those temporary closures as required under Construction Heat after enclosure.
- D. Each Contractor will be responsible for the security of his own property.

### **1.15 VEHICULAR ACCESS AND PARKING**

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.

- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- E. Parking locations will be designated by the General Contractor.
- F. Trucks and other vehicles belonging to Contractors, Subcontractors and suppliers may be parked on the site provided space is available and the vehicles are identified. Such parking shall be subject to the direction of the General Contractor.
- G. Perform cleaning of concrete equipment at location designated by the General Contractor. Remove from the site all residue accumulated from the cleaning operations of concrete equipment.
- H. Contractors failing to adequately clean vehicles or otherwise causing dirt or debris to be deposited on any public street or highway shall be responsible for all costs in connection with the cleaning thereof whether performed by the General Contractor, or at the direction of any public authority having jurisdiction.
- I. Access to the site shall be by roadways, approved by the Owner.
- J. Access Roads shall be established and maintained by the Earthwork Contractor, as directed the General Contractor.
- K. Snow Removal:
  1. General Snow removal from site access roads, parking areas, and building access will be carried out by the General Contractor.
  2. Each Contractor will be responsible for the removal of snow from their work, stored materials, and access to same.

#### **1.16 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Each contractor/subcontractor shall collect waste from the construction areas & dispose of in dumpsters as provided by the Prime Contractor.
- F. If contractor/subcontractor does not remove this waste on a timely basis, the Owner/Architect may direct the prime contractor to remove waste and the contractor/subcontractor may be back charged by the prime contractor for this removal.
- G. Separate construction waste & recycle dumpsters may be provided, and if so, all contractors shall separate all waste materials as directed and place into proper dumpster.

#### **1.17 WATER AND EROSION CONTROL**

- A. Any Contractor carrying out excavating or requiring excavations shall protect excavations, trenches, other temporary work, the building, and other work of the Project from damage from water (including ground water, rain water, backing up of sewers, and drains and ice and snow). Keep excavations and trenches free from water during the progress of the Work, and provide temporary enclosures, pumps and equipment and do all grading, pumping, bailing, or other work necessary to ensure this protection.
- B. Plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
  1. Hold the areas of bare soil exposed at one time to a minimum.
  2. Provide temporary control measures such as berms, dikes, drains and silt fences as necessary.

- C. Construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode.
- D. Protect site from puddling or running water. Provide water barriers and slope protection as required to protect site from erosion.
- E. Each Contractor shall provide protection against wind, storms, frost, rain, snow, heat and cold to avoid injury to material in transit, stored material, and Work in place.
- F. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.
- G. Remove all items not required to remain upon completion of the project and approval of the General Contractor.
- H. Clean streets & walks adjacent to the project of dirt, mud or other materials on a weekly basis.
- I. Provide silt fences and other runoff control devices as required by agencies having jurisdiction.

#### **1.18 TREE AND PLANT PROTECTION**

- A. The General Contractor shall arrange for and pay the cost of all tree protection. This shall generally consist of a project boundary fence, which shall be erected immediately upon the start of construction of the Project.
- B. Each Contractor/Subcontractor shall be responsible for carefully supervising all work to prevent injury to trees and plants and to replace, or suitably repair, trees and plants which are damaged or destroyed due to construction operations.

#### **1.19 PROTECTION OF INSTALLED WORK**

- A. Each Contractor shall see to it that protection is provided for work as follows:
  - 1. Protect installed Work and provide special protection where specified in individual specification Sections.
  - 2. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
  - 3. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
  - 4. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
  - 5. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- B. The Contractor shall arrange for the correction of any damage caused by the operations of himself or any Subcontractor and shall deduct the cost of corrections from monies due the Contract.

#### **1.20 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design and construction indicated on Drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

#### **1.21 FIELD OFFICES**

- A. None required.
- B. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.
- C. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- D. If space is available, contractors may provide a field office for their own use, installed at a suitable location on the site as designated by the General Contractor. Provide and pay for all utilities used in conjunction with field office.
- E. Locate offices a minimum distance of 30 feet from existing and new structures.

**1.22 TEMPORARY STORAGE**

- A. Contractors may provide storage sheds and/or trailers as their needs may require, and as space is available, coordinate the location with the General Contractor. All temporary structures will be removed before final acceptance of the Work.
- B. Limit use of the premises for work and for storage. Cooperation with all separate contractors on the project shall be under the direction of the General Contractor.

**1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 60 00**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Re-use of existing products.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 SUBMITTALS**

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**PART 2 PRODUCTS**

**2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- C. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.

**2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Where all other criteria are met, Contractor shall give preference to products that:
  - 1. If used on interior, have lower emissions.
  - 2. If wet-applied, have lower VOC content.
  - 3. Have a published GreenScreen Chemical Hazard Analysis.
- C. Provide interchangeable components of the same manufacture for components being replaced.

**2.03 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

## **2.04 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

## **PART 3 EXECUTION**

### **3.01 SUBSTITUTION PROCEDURES**

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- D. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  - 3. The Architect will notify Contractor in writing of decision to accept or reject request.

### **3.02 OWNER-SUPPLIED PRODUCTS**

- A. Owner's Responsibilities:
  - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
  - 2. Arrange and pay for product delivery to site.
  - 3. On delivery, inspect products jointly with Contractor.
  - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
  - 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
  - 1. Review Owner reviewed shop drawings, product data, and samples.
  - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
  - 3. Handle, store, install and finish products.
  - 4. Repair or replace items damaged after receipt.

### **3.03 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.



- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Replace damaged materials at no additional cost to the owner.
- I. Deliver items required to be built into masonry or concrete promptly to the site so they may be built in as the work progresses. Provide templates showing exact locations.
- J. Do not deliver materials subject to damage unduly long before they are required in the work and suitable storage facilities are available at the site.
- K. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.04 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to ensure products are undamaged and are maintained under specified conditions.
- O. Replace damaged materials at no additional cost to the owner.

**END OF SECTION**



**SECTION 01 70 00**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

**1.02 RELATED REQUIREMENTS**

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

**1.04 QUALIFICATIONS**

- A. For demolition work as/if necessary, employ a firm specializing in the type of work required.
- B. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.
- C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

**1.05 PROJECT CONDITIONS**

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
  - 1. Minimize amount of bare soil exposed at one time.
  - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
  - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
  - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

## **1.06 COORDINATION**

- A. This PROJECT COORDINATION ADMINISTRATOR shall coordinate the work of this project, including the work of his subcontractors.
- B. This PROJECT COORDINATION ADMINISTRATOR shall coordinate all work of the project with the Owner, the Architect and other contractors carrying out work at the site.
- C. Each Sub-Contractor and Material Supplier shall coordinate the work of his and that of related contractors, subcontractors and material suppliers with the aid of the Project Coordination Administrator.
- D. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- E. Notify affected utility companies and comply with their requirements.
- F. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- G. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- H. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- I. Coordinate completion and clean-up of work of separate sections.
- J. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

#### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

#### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

#### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  2. Grid or axis for structures.
  3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.06 ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  1. Verify that construction and utility arrangements are as shown.
  2. Report discrepancies to Architect before disturbing existing installation.
  3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
  2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- C. Remove existing work as indicated and as required to accomplish new work.
  1. Remove items indicated on drawings.
  2. Relocate items indicated on drawings.
  3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. Provide temporary connections as required to maintain existing systems in service.
  4. Verify that abandoned services serve only abandoned facilities.

5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- E. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
- F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
  1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
  2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
  3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
  4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- H. Refinish existing surfaces as indicated:
  1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- I. Clean existing systems and equipment.
- J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before demolition is complete.
- L. Comply with all other applicable requirements of this section.

### **3.07 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
  1. Complete the work.
  2. Fit products together to integrate with other work.
  3. Provide openings for penetration of mechanical, electrical, and other services.
  4. Match work that has been cut to adjacent work.
  5. Repair areas adjacent to cuts to required condition.
  6. Repair new work damaged by subsequent work.
  7. Remove samples of installed work for testing when requested.
  8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

- F. Patching work shall be done by skilled mechanics experienced in the particular type of work involved. Patching work shall conform to the standards of the Specifications where applicable and where not specified, work shall conform to the highest standards of the trade.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Restore work with new products in accordance with requirements of Contract Documents.
- I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- K. Patching:
  1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- L. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

### **3.08 PROGRESS CLEANING**

- A. The Contractor and Subcontractors will be responsible for their own cleanup as specified and removal of their own debris. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- E. Do not throw waste material and rubbish down from upper levels.
- F. Hammer in or bend over flush with the wood protruding nails in boards, planks, timbers, etc.
- G. Dispose of hazardous wastes in accordance with applicable laws and regulations.
- H. Promptly remove from the work area all waste materials and rubbish resulting from the performance of the work. Clean up on a day-to-day basis throughout the construction period.
- I. Perform continuous clean-up of flammable debris to prevent accumulation.
- J. Contractors and Subcontractors shall provide for the removal of stains and overages caused by operations, such as mastics, mortar, concrete, joint compounds, paint, caulking, etc.
- K. The Contractor shall provide periodic broom cleaning of project areas using sweeping compound as required to prevent airborne dust.
- L. The Architect may require the Contractor to broom clean any area or areas of the project at any time he feels there is excess dust or dirt, which inconveniences building occupants or finishing operations.
- M. If the premises and the site are not maintained properly at all times, the Owner may have any accumulation of waste materials or trash removed and charge the cost to the Contractor who is responsible.



- N. In addition to cleaning above, each Contractor or Subcontractor shall thoroughly clean and vacuum floors prior to the installation of the finish flooring, such as sealing exposed slabs, ceramic or quarry tile, sheet vinyl flooring, V.C.T., carpet, etc.

### **3.09 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.10 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.11 DEMONSTRATION AND INSTRUCTION**

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

### **3.12 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.13 FINAL CLEANING**

- A. At Completion of the Work promptly remove tools, equipment, machinery, and surplus materials from the Project site.
- B. The Masonry Trade Contractor is responsible for final cleaning of all masonry surfaces.
- C. Use cleaning materials that are nonhazardous.
- D. Leave all surfaces broom clean and ready for final cleaning unless otherwise required by the Specifications.
- E. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- H. The Mechanical Contractor shall clean all ductwork and grills (in and out), and polish all plumbing fixtures, trim, etc.
- I. If air handling equipment is operated during construction, filters for air handling equipment shall be replaced or thoroughly cleaned according to manufacturer's instructions, by the HVAC contractor. Clean filters of operating equipment.
- J. The electrical subcontractor shall wash, vacuum, dust or otherwise clean light fixtures and other electrical work in finished spaces as necessary to remove all stains, dust and dirt. Other electrical equipment in mechanical rooms, transformer vaults, switch gear rooms, and similar unfinished spaces shall be left "broom clean". Burned out lamps shall be replaced.
- K. All areas within lights, ducts, chases and other items, areas or equipment which will be "closed up" by the Contractor, as a part of the work of their contract, shall be thoroughly cleaned by the Contractor prior to closing up.
- L. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- M. Clean site; sweep paved areas, rake clean landscaped surfaces.
- N. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- O. The Contractor shall arrange for professional cleaners or experienced workmen for other final cleaning, to remove dust, dirt, fingerprints and labels from all interior and exterior surfaces and to polish glossy surfaces to a clear shine.
- P. The Work shall be maintained in a clean condition until the Architect determines that the Project is substantially complete.
- Q. Cleaning required by subsequent work done after Substantial Completion shall be carried out by the Contractor or Subcontractor of the required work and shall be accomplished prior to Final Completion.

### **3.14 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Substantial Completion.
  - 1. When the Work is considered Substantially Complete, as defined in the General Conditions THE PRIME OR PRIME TRADE CONTRACTOR shall submit to the Architect:

- a. A written notice that the Work, or designated portion thereof, is substantially complete.
    - b. A list of items to be completed or corrected.
  - 2. Within a reasonable time after receipt of such notice, Architect will make a pre-final inspection to determine the status of completion.
  - 3. Should the Architect determine that the Work is not Substantially Complete:
    - a. Architect will promptly notify the Contractor in writing, giving the reasons therefor.
    - b. Contractor will remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the Architect.
    - c. The Architect will reinspect the Work.
- D. Should the Architect determine that the Work is not Substantially Complete:
  - 1. Architect will promptly notify the Contractor in writing, giving the reasons therefor.
    - a. Contractor will remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the Architect.
    - b. The Architect will reinspect the Work.
    - c. When the Architect finds that the Work of all Contractors is Substantially Complete, the Architect will execute and deliver to Certificates of Substantial Completion to the Prime contractor with a revised list of items to be completed or corrected before final payment.
- E. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
  - 1. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
  - 1. When the Work is considered complete, submit written certification to the Architect along with a copy of the punch list confirming completion of each individual item listed, that:
    - a. Contract Documents have been reviewed.
    - b. Work has been inspected for compliance with Contract Documents.
    - c. Work has been completed in accordance with Contract Documents.
    - d. Equipment and systems have been tested in the presence of the Owner's Representative and are operational.
    - e. Work is clean and ready for final inspection.
  - 2. Upon receipt of the above certification, the Architect/Engineer shall set a date for final inspection to be made only when the project is complete and when all deficiencies of the pre-final inspection have been corrected.
  - 3. One week prior to this date, the Architect will inform the Owner and contractors of this inspection in writing.
  - 4. Immediately following this inspection, the Architect shall prepare a written report listing the names of all persons present at the inspection and the Architect shall prepare a punch list of all deficiencies for completion and correction. Copies of this report will be provided to the Owner, General contractor and the bonding company.
  - 5. Should Architect consider that the Work is incomplete or defective:
    - a. Architect will promptly notify the Contractor or Contractors in writing, listing the incomplete or defective work.
    - b. Contractor will take immediate steps to correct the stated deficiencies, and send a second written certification to Architect that the Work is complete.
    - c. Architect will re-inspect the Work.

- d. Contractor or Contractors will be responsible for any reinspection cost incurred by Owner due to the necessity of the Architect's re-inspection.
- H. Final Completion:
- 1. Test Reports and Certificates: Provide all test reports and certificates required in the technical sections, prior to final payment. Provide a check list of required reports and certificates, by Specifications sections.
  - 2. Retention of Records: Retain all records as required by law and good business practice.
  - 3. Remove all temporary utilities as the job progress permits.
  - 4. Temporary Facilities: As the job progresses and facilities are no longer needed, they shall be removed by the Contractor. Prior to final payment, remove temporary sheds, fences, barricades, surplus materials, debris and other material or items not part of the Project.
- I. Closeout Submittals:
- 1. When the Owner has determined that the Work is acceptable under the Contract Documents and the Contract fully performed, Contractor shall prepare and submit final Application for Payment to the Architect together with the following:
    - a. Insurance: Refer to Section 00 73 00.
      - 1) The specified Property Insurance (Multiple Peril Builder's Risk) shall be maintained until final acceptance by the Owner of the entire Project.
    - b. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706.
    - c. Consent of surety to final payment of Consent of Surety Company to Final Payment, AIA Document G707. The Consent of the Surety Company must be obtained prior to any reduction of retained percentage and prior to final payment.
    - d. Minnesota Department of Revenue "Withholding Affidavit for Contractors" document IC-134, fully completed and certified.
    - e. Evidence of Compliance with requirements of governing authorities:
      - 1) Certificate of Inspection from all required agencies and departments.
      - 2) Certificate of Occupancy.
    - f. Operating and Maintenance Data, Instructions to Owner's Personnel.
    - g. Warranties and Bonds.
    - h. Project Record Documents.
    - i. Special tools required for Owner maintenance.
  - 2. Submit four copies each of Items "b" and "c" above, and two copies each of Items "a" and "d" through "f".
- J. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.
- K. Final Adjustment of Accounts:
- 1. Submit a Final Statement of accounting to the Architect.
  - 2. Reflect all adjustments to the Contract Sum in the statement as follows:
    - a. The original Contract Sum.
    - b. Additions and deductions resulting from:
      - 1) Previous Change Orders
      - 2) Unit Prices.
      - 3) Deductions for uncorrected Work.
      - 4) Deductions for Re-inspection Payments.
      - 5) Other Adjustments.
    - c. Total Contract Sum, as adjusted.
    - d. Previous Payments.
    - e. Sum Remaining Due.
  - 3. Submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

- L. Corrective Work & Follow-Up Inspections: The Owner shall notify the Contractor of required corrective work after completion, and the Contractor shall actively supervise such Work. The Institution shall not be inconvenienced as to prompt service and/or corrections by the Contractor that may be necessary.

**END OF SECTION**



**SECTION 01 78 00**  
**CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 72 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Prepare data in the form of an instructional manual for use by the Owner's personnel.
  - 2. Format shall conform to the following:
    - a. Size 8-1/2" x 11"
    - b. Text: Manufacturer's printed data, or neatly typewritten.
    - c. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
      - 1) Title of Project
      - 2) Identity of separate structure as applicable.
      - 3) Identity of general subject matter covered in the manual.
    - d. Provide fly-leaf for each separate product, or each piece of operating equipment.
      - 1) Provide typed description of product, and major component parts of equipment.
      - 2) Provide indexed tabs.
    - e. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
      - 1) Title of Project
      - 2) Identity of separate structure as applicable.
      - 3) Identity of general subject matter covered in the manual.
  - 3. Binders
    - a. Commercial quality three-ring binders with durable and cleanable plastic covers.
    - b. When multiple binders are used, correlate the data into related consistent groupings.
- C. Content of Manual:
  - 1. Arrange neatly a typewritten table of contents for each volume, in the following systematic order.
    - a. Trade Contractor, name of responsible principal, address and telephone number.
    - b. A list of each product required to be included, indexed to the content of the volume.
    - c. List, with each product, the name, address and telephone number of:
      - 1) Trade Contractor or installer
      - 2) Maintenance contractor, as appropriate
      - 3) Identify the area of responsibility of each
      - 4) Local source of supply for parts and replacement

- d. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
  2. Product Data
    - a. Include only those sheets which are pertinent to the specific product.
    - b. Annotate each sheet to:
      - 1) Clearly identify the specific product or part installed.
      - 2) Clearly identify the data applicable to the installation.
      - 3) Delete references to inapplicable information.
  3. Written text, as required to supplement product data for the particular installation:
    - a. Organize in a consistent format under separate headings for different procedures.
    - b. Provide a logical sequence of instructions for each procedure.
    - c. Do not use Project Record Documents as maintenance drawings.
  4. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  5. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  6. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  7. Submit two sets of revised final documents in final form within 10 days after final inspection.
- D. Warranties and Bonds:
1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
  4. Copy of each warranty, bond and service contract issued.
    - a. Provide information sheet for Owner's personnel, give:
      - 1) Proper procedures in the event of failure.
      - 2) Instances which might affect the validity of warranties or bonds.
    - b. Provide a logical sequence of instructions for each procedure.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  1. Drawings.
  2. Specifications.
  3. Addenda.
  4. Change Orders and other modifications to the Contract.
  5. Reviewed shop drawings, product data, and samples.
  6. Manufacturer's instruction for assembly, installation, and adjusting.
  7. Architect/Engineer Field Orders or written instructions.
  8. Field test records.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Maintain record documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.



- F. Make record documents and samples available at all times for inspection by Architect and/or Owner.
- G. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates utilized.
  - 3. Changes made by Addenda and modifications.
- H. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Measured depths of foundations in relation to finish first floor datum.
  - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 4. Field changes of dimension and detail.
  - 5. Changes made by Field Order or by Change Orders.
  - 6. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
  - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.

- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
  2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Operating instructions.
    - e. Maintenance instructions for equipment and systems.
    - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
  3. Part 3: Project documents and certificates, including the following:
    - a. Shop drawings and product data.
    - b. Air and water balance reports.
    - c. Certificates.
    - d. Photocopies of warranties and bonds.
- N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- O. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

**END OF SECTION**



**SECTION 02 41 00  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of building elements for alteration purposes.

**1.02 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove portions of existing buildings in the following sequence:
  - 1. Perform demolition as required by the construction sequence.
- B. Remove other items indicated, for salvage, relocation, and recycling.

**3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 3. Provide, erect, and maintain temporary barriers and security devices.
  - 4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  - 5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 6. Do not close or obstruct roadways or sidewalks without permit.
  - 7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  - 8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.
- E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

**3.03 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.

- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

### **3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of steel stud construction and polyethelene covering.
- C. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  - 3. Verify that abandoned services serve only abandoned facilities before removal.
  - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- E. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch as specified for patching new work.

### **3.05 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 03 10 00  
CONCRETE FORMING AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (reapproved 2015).
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute; 2016.

**1.04 DESIGN REQUIREMENTS**

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

**1.06 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for design, fabrication, erection and removal of formwork.

**PART 2 PRODUCTS**

**2.01 FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

**2.02 WOOD FORM MATERIALS**

- A. Form Materials: At the discretion of the Contractor.

**2.03 REMOVABLE PREFABRICATED FORMS**

- A. Preformed Steel Forms: Minimum 16 gage (1.5 mm) matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

**2.04 FORMWORK ACCESSORIES**

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch (25 mm) in concrete surface.

- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
- C. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.
- D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- E. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### **3.02 ERECTION - FORMWORK**

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.

### **3.03 APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

### **3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

### **3.05 FORM CLEANING**

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
  1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
  2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

### **3.06 FORMWORK TOLERANCES**

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

### **3.07 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

**END OF SECTION**



**SECTION 03 20 00  
CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 03 30 00 - Cast-in-Place Concrete.
- C. Section 04 20 00 - Unit Masonry: Reinforcement for masonry.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2016.
- B. ACI 318 - Building Code Requirements For Structural Concrete and Commentary; American Concrete Institute International; 2014 (Errata 2018).
- C. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 2004.
- D. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement 2019.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2020.
- F. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; American Welding Society; 2018.
- G. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2009.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301.
- B. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

**PART 2 PRODUCTS**

**2.01 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
  - 1. Deformed billet-steel bars.
  - 2. Unfinished.
- B. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gage (1.5 mm).
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

**2.02 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

## **PART 3 EXECUTION**

### **3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Conform to applicable code for concrete cover over reinforcement.

**END OF SECTION**

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete building frame members.
- B. Floors and slabs on grade.
- C. Joint devices associated with concrete work.
- D. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 20 00 - Concrete Reinforcing.
- C. Section 07 90 05 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete 2016.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- F. ACI 305R - Guide to Hot Weather Concreting 2010.
- G. ACI 306R - Guide to Cold Weather Concreting 2016.
- H. ACI 308R - Guide to External Curing of Concrete 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- J. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2020.
- L. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- M. ASTM C150/C150M - Standard Specification for Portland Cement 2020.
- N. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.
- O. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- P. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.
- Q. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2013.
- R. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.
- S. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types) 2018.
- T. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting 2015.
- U. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers 2020.

- V. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric) 2014.
- W. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit concrete mix design to the Architect for approval
- C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- D. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Comply with requirements of Section 03 10 00.

#### **2.02 REINFORCEMENT**

- A. Comply with requirements of Section 03 20 00.

#### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150, Type I - Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C 33.
  - 1. Course Aggregate Material: Strong, clean crushed granite or limestone gravel, are subject to approval as to use, other inert material having similar characteristics, free from adherent coatings and injurious amount of friable or fragile pieces, flake organic matter, or other deleterious substances, all meeting the following gradation requirements:
    - a. Footings - 1"
    - b. Foundations - 1"
    - c. Slabs - 1"
    - d. Fine Aggregate Material: Clean, strong, natural are subject to approval and authorization as to use, other inert material suitable for the work to be done, having characteristics similar to natural sand, free of frozen materials, all meeting the following grading limits:
      - 1) Passing No. 4 Sieve: 95% to 100%
      - 2) Passing No. 14 Sieve: 45% to 80%
      - 3) Passing No. 50 Sieve: 10% to 30%
      - 4) Passing No. 100 Sieve: 2% to 10%
- C. Fly Ash: ASTM C618, Class F.
- D. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- E. Water: Clean and not detrimental to concrete.

#### **2.04 ADMIXTURES**

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C 260 to produce Air Entrainment of between 5% to 7%. None - N/A Air entrainment admixture shall be used in strict accordance with the manufacturers recommendations and shall be one of the following or approved equal:
  - 1. W.R. Grace - Darex AEA
  - 2. Protex Industries - Pro-Air

3. W.R. Meadows - Sealtight Air Entrainment Agent
  4. Sika - Sika AER
  5. Euclid - Air Mix
- C. Chemical Admixtures: ASTM C 494/C 494M, Type A - Water Reducing.
1. Provide products manufactured by Sika Corporation or The Euclid Chemical Company.
  2. Water reducing admixtures are required for concrete slabs on grade to produce a water to cement ratio of 0.45. Submit manufacturer's literature for the specific water reducing admixture to be provided based on mix designers experience for results to be achieved based on specific conditions of the concrete pour.

## 2.05 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: High density polyethylene meeting the requirements of ASTM E 1745, Class A and with the following minimum characteristics:
1. Tensile Strength per ASTM E 154, Section 9: 45.0 lbf/in.
  2. Puncture Resistance per ASTM D 1709, Method B: 2200 grams.
  3. Permeance per ASTM E 96: 0.018 perms.
  4. Under Slab Vapor Retarders shall be as manufactured by one of the following or approved equal:
    - a. Raven Industries Inc. - Vapor Block 15; 1812 E. Ave., Sioux Falls, SD 57104; phone 800-635-3456.
    - b. Reef Industries, Inc. - 15 Mil Green; PO Box 750250, Houston, TX 77275-0250; phone 713-507-4200.
    - c. W.R. Meadows, Inc. - Perminator 15 Mil; P.O. Box 338, Hampshire, IL 60140-0338; phone 800-342-5976.
    - d. Stego Industries LLC - Stego Wrap 15 mil Class A, 27442 Calle Arroyo, Suite A, San Juan, CA 92675; phone 877-464-7834.
    - e. Insulation Solutions Inc. - Viper VaporCheck II 15 mil Class A, 401 Truck Haven Road, East Peoria, IL 61611; phone 866-698-6562.
    - f. Furnish all sealants, sealing tapes, pipe boots and other accessories as required by the manufacturer for a complete installation.
    - g. See section 07 26 16: Below Grade Vapor Retarders - Special vapor barrier below wood gym floor.
- B. Moisture-Retaining Cover: ASTM C171; clear polyethylene.
- C. Underlayment for leveling floors to tolerances shall be portland cement based pourable underlayment. Furnish primers as recommended by the manufacturer. Self-leveling underlayment shall be as manufactured by one of the following or approved equal:
1. Ardex Inc. - K-15
  2. Sika - Sikaset
  3. Euclid Chemical Company - Flo-Top
  4. Tamms - Thin Patch
- D. Liquid Densifier/Sealer: Sodium Silicate Concrete Compound, liquid type. Chemical Hardener shall be as manufactured by one of the following or approved equal:
1. Sonneborn - Kure-N-Hard
  2. TK Products - TK-5329 Floor Hardener and Densifier.
  3. L&M Construction Chemicals - Chem Hard
  4. Euclid - Euco Diamond Hard
  5. Vexcon Chemicals, Inc. - Starseal PS Clear.
  6. Curecrete Chemical Company, Inc. - Ashford Formula
- E. Curing/Sealing Concrete Surfaces: Curing/Sealing compound shall be high solids, non-yellowing methyl methacrylate polymers conforming to ASTM 1315, Type 1, Class A. Product to protect slab from freeze/thaw cycles and inherits protection from salt, grease and other hazardous variables. Use a product that includes (MMA) Methyl Methacrylate to safeguard from salt. Compound shall be VOC compliant material to render the surface with a glossy appearance resistant to dirt and moisture penetration. All exposed aggregate floors shall receive two coats of the following or approved equal:
1. TK Products - Bright Kure & Seal.

2. The Euclid Chemical Company - Super Diamond Clear.
3. Vexcon Chemicals - Vexcon Starseal 1315.
4. Degussa Construction Chemicals - Kure-N-Seal 25LV.
5. W.R. Meadows - Epoxo-Gloss.

## **2.06 BONDING AND JOINTING PRODUCTS**

- A. BOND BREAKER: at juncture of interior concrete slabs and adjacent walls shall be 15 lb. felt with adhesive on one side.
  1. Expansion Joint Filler: shall be an asphalt, vegetable fibres and mineral filler joint formed under heat and pressure between two asphalt felt liners conforming to ASTM D994. It shall be resistant to oil, solvents, ozone and weathering. Joint Filler shall be as manufactured by W.R. Meadows, Inc. - Sealtight Asphalt Expansion Joint Filler.
  2. Sealant and Primer: As specified in Section 07 90 05.
- B. CONCRETE MIX DESIGN
  1. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
  2. Furnish the following types of concrete:
    - a. Footings - 1" aggregate, 4000 psi, non-air entrained.
    - b. Foundations - 1" aggregate, 4000 psi, non-air entrained.
    - c. Slabs - 1" aggregate, 4000 psi, non-air entrained, water reducing admixture to produce a water to cement ratio of 0.45.
  3. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- C. MIXING
  1. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- C. Install Below Slab Vapor Retarder: Install vapor retarder under interior slabs on grade, as shown on drawings. Lap joints minimum 6 inches and seal watertight by taping edges and ends. All penetrations of the vapor retarder shall be sealed. Any stakes driven through the vapor retarder shall be sealed.
  1. Install materials in accordance with manufacturer's instructions.
  2. Level and compact granular base as specified in Section 31 23 23.
  3. Unroll vapor retarder with the longest dimension of the pour and pull out the folds to the full width of the product.
  4. Lap vapor retarder onto the foundation wall to the height of the concrete slab and seal with two sided tape.
  5. Seal around all pipe penetrations with pipe boots or material and tape as per manufacturer's instructions. Seal around all other penetrations with an elastomeric sealant to create a monolithic membrane between the surface of the slab and moisture sources below and at the slab perimeter as per manufacturer's instructions.
  6. Holes or punctures through the vapor retarder shall be sealed with a patch and seaming tape prior to pouring concrete.
  7. Protection: When installing reinforcing steel and utilities in addition to the placement of concrete, take precautions to protect the vapor retarder. Provide additional protection in high traffic areas.
  8. Use only brick-type reinforcing bar supports to protect the membrane from puncture.
  9. Avoid driving stakes through the vapor retarder. If this cannot be avoided, each individual hole must be repaired.

### **3.03 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### **3.04 SLAB JOINTING**

- A. Locate joints as indicated on the drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Separate slabs from vertical surfaces with bond breaker.
- E. Install joint devices in accordance with manufacturer's instructions.
- F. Apply sealants in joint devices per general standard practice or in accordance with
- G. Section 07 90 05.
- H. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

### **3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
  - 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
  - 2. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
  - 3. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
- B. Measure F(F) and F(L) in accordance with ASTM E1155, within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- C. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.06 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 301.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
  - 2. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

### **3.07 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
  - 1. Normal concrete: Not less than 7 days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms: Apply concrete hardener and sealer in accordance with manufacturer's standards/recommendations. Densifier/sealer should be installed just prior to substantial completion or as directed by manufacturer.
  - 1. Curing/Sealing New Concrete:
    - a. Apply in accordance with manufacturer's instructions.
    - b. Apply immediately after surface water has dissipated, and concrete can withstand weight.
    - c. Apply at a rate of 200 - 300 square feet per gallon for the first and second coats using spray brush or roller.
    - d. Avoid buildup which can cause slippery conditions or lifting action between coats. Protect from freezing Do not apply if concrete surface and ambient temperatures are below 40 degrees F.

### **3.08 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cu yd or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- H. Slab Moisture Content: Test concrete slabs on grade in accordance with ASTM F2170 - 02, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. Flooring materials shall not be installed over floors with a relative humidity greater than 80%.

**END OF SECTION**



**SECTION 04 72 00  
CAST STONE MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural cast stone.
- B. Units required: See drawings.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.
- B. Section 07 90 05 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.

**1.03 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2014 (Errata 2018).
- B. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- D. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- E. ASTM C150/C150M - Standard Specification for Portland Cement; 2020.
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- G. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019.
- H. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2013.
- I. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.
- C. Product Data: Test results of cast stone components made previously by the manufacturer.
- D. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- E. Mortar Color Selection Samples.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A current producer member of the Cast Stone Institute with a minimum of 5 years of experience in producing cast stone of the types required for project and:
  - 1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
  - 2. Products previously produced by plant and exposed to weather that exhibit satisfactory appearance.
- B. Source Quality Control: Test compressive strength and absorption of specimens selected at random from plant production.
  - 1. Test in accordance with ASTM C642.
  - 2. Select specimens at rate of 3 per 500 cubic feet, with a minimum of 3 per production week.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

- B. Number each piece individually to match shop drawings and schedule.
- C. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- D. Store cast stone components on pallets with non-staining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- F. Store mortar materials where contamination can be avoided.
- G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Architectural Cast Stone:
  - 1. Any current producer member of the Cast Stone Institute.
  - 2. American Artstone.
  - 3. Amcon Block.
  - 4. Marcstone.
  - 5. Stoneworks Architectural Precast.
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 ARCHITECTURAL CAST STONE**

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
  - 1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
  - 2. Freeze-Thaw Resistance: Demonstrated by field experience.
  - 3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
  - 4. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
  - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
  - 2. Unless otherwise indicated on drawings, provide:
    - a. Wash or slope of 1:12 on exterior horizontal surfaces.
    - b. Drips on projecting components, wherever possible.
    - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.

### **2.03 MATERIALS**

- A. Portland Cement: ASTM C150.
  - 1. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C33, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C33, except for gradation; natural or manufactured sands.
- D. Admixtures: ASTM C494/C494M.
- E. Water: Potable.
- F. Reinforcing Bars: ASTM A615/A615M deformed bars, galvanized or epoxy coated.
- G. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.
- H. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.
- I. Mortar: Portland cement-lime, ASTM C270, Type N; do not use masonry cement.

- J. Sealant: As specified in Section 07 90 05.
- K. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

#### **3.02 INSTALLATION**

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 20 00.
- B. Mechanically anchor cast stone units indicated; set remainder in mortar.
- C. Setting:
  - 1. Drench cast stone components with clear, running water immediately before installation.
  - 2. Set units in a full bed of mortar unless otherwise indicated.
  - 3. Fill vertical joints with mortar.
  - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- D. Joints: Make all joints 3/8 inch, except as otherwise detailed.
  - 1. Rake mortar joints 3/4 inch for pointing.
  - 2. Remove excess mortar from face of stone before pointing joints.
  - 3. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
  - 4. Leave the following joints open for sealant:
    - a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
    - b. Joints in projecting units.
    - c. Joints between rigidly anchored units, including soffits, panels, and column covers.
    - d. Joints below lugged sills and stair treads.
    - e. Joints below ledge and relieving angles.
    - f. Joints labeled "expansion joint".
- E. Sealant Joints: Install sealants as specified in Section 07 90 05.
- F. Repairs: Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
  - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
  - 2. Repair methods and results subject to Architect's approval.

#### **3.03 CLEANING**

- A. Keep cast stone components clean as work progresses.

#### **3.04 PROTECTION**

- A. Protect completed work from damage.
- B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

**END OF SECTION**



**SECTION 04 73 00  
MANUFACTURED STONE MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural manufactured stone.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Substrate materials.
- B. Section 07 90 05 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Installation details.
- C. Mortar Color Selection Samples.
- D. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Store cast stone components and installation materials in accordance with manufacturer's instructions.
- C. Store cast stone components on pallets with non-staining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- D. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.
- E. Store mortar materials where contamination can be avoided.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Architectural Stone:
  - 1. Cultured Stone, PO Box 270, Napa, CA 94559-0270; phone 1-800-255-1727.
  - 2. St. Croix Stone, 23950 Lake Boulevard N., Forest Lake, MN 55025; phone 866-464-8770.
  - 3. Eldorado Stone, phone 800-925-1491.
  - 4. Boulder Creek Stone Products, 8282 Aurther Street N.E., Minneapolis, MN 55432; phone 763-786-7276.
  - 5. Coronado Stone Products, 11191 Calabash Ave., Fontana, CA 92337; phone 909-357-7362.

**2.02 MATERIALS**

- A. Architectural Stone:
  - 1. Cultured Stone, PO Box 270, Napa, CA 94559-0270; phone 1-800-255-1727.
  - 2. St. Croix Stone, 23950 Lake Boulevard N., Forest Lake, MN 55025; phone 866-464-8770.
  - 3. Eldorado Stone, phone 800-925-1491.
  - 4. Boulder Creek Stone Products, 8282 Aurther Street N.E., Minneapolis, MN 55432; phone 763-786-7276.
  - 5. Coronado Stone Products, 11191 Calabash Ave., Fontana, CA 92337; phone 909-357-7362.
- B. Provide corner pieces at all areas required as necessary.
  - 1. Provide stepped panel corners as needed.

- C. Mortar: As applicable
  - 1. Portland Cement ASTM C150, Type I.
  - 2. Masonry Sand ASTM C 144.
  - 3. Hydrated Lime: ASTM C 207, Type S.
  - 4. Pigments for Colored Mortar: Iron or chromium oxides with demonstrated stability and colorfastness. Mortar coloring shall be as manufactured by Solomon Colors, Prism Pigment, or Davis Colors.
- D. Weather Resistant Barrier: Self-adhesive fiberglass reinforced rubberized asphalt sheet, with strippable release film, 40 mil. thick min., integrally bonded to a slip-resistant polyethylene sheeting as manufactured by one of the following or approved equal:
  - 1. Grace Construction Products - Ice & Water Shield
  - 2. Certaineed - Winterguard
  - 3. GAF - StormGuard
  - 4. Tamko - Moisture Guard
  - 5. Mirafi - Miradri WIP
  - 6. Total Thickness: 58 mils.
- E. Rain Screen: Perforated 0.024" thick high impact polystyrene strip formed with 3/16 inch deep corrugations, 16 inches wide with a 18 inch spunbonded polypropylene fabric on one side with a 2 inch skirt on one edge. Spunbonded fabric shall have a flux, water flow rate of 200 gallons per square foot per minute. Rain Screen shall be Masonry Technology Incorporated - MTI Sure Cavity #SC 5016, phone 800-879-1122, as distributed by Brock White.
- F. Metal Lath: 18 gauge galvanized woven wire mesh, 2.5 lb. flat diamond mesh or galvanized 3.4 lb. flat rib.
- G. Sealant: As specified in Section 07 90 05.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install cultured stone in accordance with manufacturer's instructions.
- B. Install one layer of weather resistant barrier over wall sheathing in shingle fashion. Lap joints 4 inches.
- C. Exterior Stone: Install Rain Screen drainage sheet over weather resistant barrier with spunbond fabric to the exterior of the building and 2 inch skirt to the bottom. Fabric skirt should be folded back under the bottom of the first course to create a bug screen. Overlap skirt over the top of each succeeding course.
- D. Apply metal lath with galvanized or other exterior rated screws which penetrate a minimum of 1 inch into wall framing. Apply lath 6 inches on center vertically and 16 inches on center horizontally.
- E. Wrap weather resistant barrier, rain screen and metal lath a minimum of 16 inches around all inside and outside corners.
- F. Mortar Mixing: Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270, Type N.
- G. Apply 1/2 inch to 3/4 inch of mortar to lath, covering a minimum of 10 square feet at one time. Press Cultured Stone units firmly into position in soft mortar bed, wiggle and apply slight pressure to unit to ensure firm bonding causing mortar to extrude slightly around edges of units.
- H. Place units with uniform joints between units. Stone joints should not be over 1/2 inch in width.
- I. Plan work to minimize job site cutting. Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking units corners or edges.
- J. Point joints with mortar and tool to concave shape.
- K. Remove excess mortar; do not allow mortar to set up on face of units. Clean and finish joints in accordance with manufacturer's instructions.

- L. Sealant Joints: Install sealants as specified in Section 07 90 05.
- M. Repairs: Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
  - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
  - 2. Repair methods and results subject to Architect 's approval.

### **3.02 CLEANING**

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.
  - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
  - 2. Repair methods and results subject to Architect 's approval.

**END OF SECTION**





**SECTION 05 31 00  
STEEL DECKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal form deck.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.

**1.03 REFERENCE STANDARDS**

- A. ASTM A 611 - Standard Specification for Structural Steel (SS), Sheet, Carbon, Cold-Rolled; 1997.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- D. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2015.
- E. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; American Welding Society; 2008.
- F. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute; 2007.
- G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- I. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

**1.04 PERFORMANCE REQUIREMENTS**

- A. Select and design metal deck in accordance with SDI Design Manual.
- B. Calculate to structural working stress design and structural properties specified.
- C. Maximum Vertical Deflection of Roof Deck: 1/240.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

**1.06 QUALITY ASSURANCE**

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 10 years of experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

## **PART 2 PRODUCTS**

### **2.01 STEEL DECK**

- A. Metal Form Deck: Corrugated sheet steel:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
  - 2. Provide form deck of size, gauge, depth and profile as shown and noted on drawings.

### **2.02 ACCESSORY MATERIALS**

- A. Welding Materials: AWS D1.1/D1.1M.
- B. Fasteners: Galvanized hardened steel, self-tapping.
- C. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- F. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **3.02 INSTALLATION**

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch bearing.
- C. On steel supports provide minimum 1-1/2 inch bearing.
- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods indicated on drawings.
  - 1. Welding: Use fusion welds through weld washers.
- E. At mechanically fastened male/female side laps fasten at 24 inches on center maximum or as shown on drawings.
- F. At welded male/female side laps weld at 18 inches on center maximum.
- G. Weld deck in accordance with AWS D1.3/D1.3M.
- H. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

**END OF SECTION**

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 09 91 13 - Exterior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; most recent.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- F. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2020a.
- G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2014, with Editorial Revision (2017).
- I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021.
- J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
- K. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- L. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- M. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019, with Editorial Revision (2020).
- O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- P. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- Q. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).
- R. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).
- S. SSPC-SP 2 - Hand Tool Cleaning 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

### **2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.03 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of stairs, railings, and as required to trim and close ends of etc. as shown on drawings; prime paint finish.
- C. Pipe rail wall brackets for railings mounted on walls shall be Julius Blum & Co. - No. 319, Bronze for round pipe.

### **2.04 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prime Painting: One coat.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**



**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Structural wall framing.
- E. Built-up structural beams and columns.
- F. Wall and roof sheathing.
- G. Roofing nailers.
- H. Preservative treated wood materials.
- I. Miscellaneous framing and sheathing.
- J. Communications and electrical room mounting boards.
- K. Manufactured Lumber.
- L. Concealed wood blocking for support of wall mounted accessories, etc.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 17 53 - Shop-Fabricated Wood Trusses.

**1.03 REFERENCE STANDARDS**

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2012.
- F. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; National Institute of Standards and Technology, U.S. Department of Commerce; 2010.
- G. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.
- H. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.
- I. International Building Code and the State of Minnesota Building Code.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and fire treated materials.
- C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

**1.05 QUALITY ASSURANCE**

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

## **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Dimensional Lumber for framing (2x4 and 2x6 as required):
  - 1. Species: Spruce, Pine, Fir.
  - 2. Grade: No. 2 or better, with minimum design values as shown on drawings.
- E. Dimensional Lumber (2x8, 2x10, 2x12 as required):
  - 1. Species: Douglas Fir or Southern Yellow Pine
  - 2. Grade: No. 2, with minimum design values as shown on drawings.
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.
- G. Miscellaneous Blocking, Furring, and Nailers:
  - 1. Lumber: S4S, No. 2 or Standard Grade.

### **2.03 EXPOSED DIMENSION LUMBER**

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings.
- C. Surfacing: S4S.
- D. Sizes: Nominal sizes as indicated on drawings, S4S.
- E. Moisture Content: S-dry or MC19.

### **2.04 EXPOSED BOARDS**

- A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.

### **2.05 MANUFACTURED LUMBER**

- A. Prefabricated structural wood shall be veneer lumber bonded with a waterproof adhesive and cured under pressure Laminated Veneer Lumber (LVL) of the size and configuration shown on the drawings. Laminated Veneer Lumber shall conform to the following properties:
  - 1. E = 2,000,000 psi
  - 2. Fb = 3,100 psi
  - 3. Fv = 285 psi
  - 4. Fc(perp) = 900 psi
  - 5. Fc(para) = 3,000 psi



## 2.06 CONSTRUCTION PANELS

- A. Subfloor/Underlayment Combination: Any PS 2 type, rated Single Floor.
  - 1. Bond Classification: Exterior.
  - 2. Span Rating: 48.
  - 3. Performance Category: 1-1/8 PERF CAT.
  - 4. Thickness: 3/4 inches, nominal.
- B. Roof Sheathing: Oriented strand board wood structural panel; PS 2.
  - 1. Grade: Structural 1 Sheathing.
  - 2. Bond Classification: Exposure 1.
  - 3. Span Rating: 32/16.
  - 4. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
  - 5. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches and 24 inches on center, respectively.
  - 6. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
- C. Wall Sheathing: Oriented strand board wood structural panel; PS 2.
  - 1. Grade: Structural 1 Sheathing.
  - 2. Bond Classification: Exposure 1.
  - 3. Performance Category: 5/8 PERF CAT.
  - 4. Span Rating: 40/20.
  - 5. Edges: Square.
  - 6. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
  - 7. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches and 24 inches on center, respectively.
  - 8. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
- D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- E. Other Applications:
  - 1. Other Locations: PS 1, C-D Plugged or better.

## 2.07 ACCESSORIES

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
  - 1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing per ASTM A653/A653M.
- C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
- D. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls. Provide Sill Sealer manufactured by Certainteed.

## 2.08 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

- B. Fire Retardant Treatment: AWWA Treatment C27 for plywood, Interior Type A Low Temperature (low hygroscopic), chemical treatment pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 or less / 25 or less. Provide Dricon manufactured by Hickson Corporation or approved equal.
- C. Preservative Pressure Treatment of Lumber above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
  - 1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - a. Treat lumber in contact with roofing, flashing, or waterproofing.
    - b. Treat lumber in contact with masonry or concrete.
    - c. Treat lumber less than 18 inches above grade.
    - d. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
      - 1) Kiln dry plywood after treatment to maximum moisture content of 19 percent.
      - 2) Treat plywood in contact with roofing, flashing, or waterproofing.
      - 3) Treat plywood in contact with masonry or concrete.
      - 4) Treat plywood less than 18 inches above grade.
- D. Preservative Pressure Treatment of Lumber in Contact with Soil: AWWA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft (6.4 kg/cu m) retention.
- E. Preservative Pressure Treatment of Critical Structural Members in Contact with Soil: AWWA Use Category UC6A, Commodity Specification A (Treatment C2) using waterborne preservative to 0.6 lb/cu ft retention.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

#### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

#### **3.03 FRAMING INSTALLATION**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- D. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- E. Install structural members full length without splices unless otherwise specifically detailed.
- F. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- G. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- I. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.

- J. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

### **3.04 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Specifically, provide the following non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.

### **3.05 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

### **3.06 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD**

- A. Place sill gasket directly on cementitious foundation. Puncture gasket cleanly and fit tightly to protruding foundation anchor bolts.
- B. All finished work shall be scribed and coped as required for an accurate fit and erected plumb, true square and in accordance with the drawings. Correlate location of nailers, blocking grounds and similar supports to allow proper attachment or other work. All work shall be secured in place with screws or nails as required. Countersink and fill all nail and screw heads exposed to view.
- C. This Contractor shall furnish and install all nails, spikes, screws, bolts and other similar items of rough hardware required in the progress of his work and shall install all items of finish hardware furnished by others.
- D. As finish hardware is delivered, this Contractor shall check all items against approved hardware listing and assume full responsibility for same until completion of building. He shall inspect the work of other trades which are to receive hardware and report in writing any defects found in same before installing. Installation of any hardware by this contractor shall imply his acceptance of the work of others.

### **3.07 INSTALLATION OF CONSTRUCTION PANELS**

- A. Wall Sheathing: Secure with long dimension parallel to wall studs, with ends over firm bearing using nails. Stagger vertical joints at least one stud space. Allow 1/8" spacing at panel ends and edges. Attach APA rated wall sheathing to framing members with 6d common nails spaced 6" on center at the edges and 12" on center at intermediate supports.
- B. Roof Sheathing: Install APA rated roof sheathing with long dimension at right angles to framing members. Stagger end joints at each alternate course. Allow 1/8" spacing at panel ends and edges. Attach APA rated roof sheathing to decking members with 10d common nails spaced 4" on center at the edges, 6" on center at supports, and 12" on center throughout the field of the panel.
- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.

2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
3. Install adjacent boards without gaps.

**END OF SECTION**

**SECTION 06 17 53**  
**SHOP-FABRICATED WOOD TRUSSES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated wood trusses for roof framing.
- B. Bridging, bracing, and anchorage.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Installation requirements for miscellaneous framing.
- B. Section 06 10 00 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

**1.03 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber 2019.
- C. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction 2014.
- D. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses 2018.
- E. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses 1989.
- F. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.
- G. WWPA G-5 - Western Lumber Grading Rules 2017.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.
- C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
  - 1. Include identification of engineering software used for design.
  - 2. Provide shop drawings stamped or sealed by design engineer.

**1.05 QUALITY ASSURANCE**

- A. Truss Design, Fabrication, and Installation: In accordance with TPI 1, TPI DSB-89, and BCSI 1.
- B. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- C. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Handle and erect trusses in accordance with TPI BCSI 1.
- B. Store trusses in vertical position resting on bearing ends.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Truss Plate Connectors:
  - 1. Alpine, an ITW Company: [www.alpineitw.com/#sle](http://www.alpineitw.com/#sle).
  - 2. MiTek Industries, Inc: [www.mii.com/#sle](http://www.mii.com/#sle).
  - 3. Simpson Strong-Tie Co., Inc..

4. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 TRUSSES**

- A. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.
  1. Connectors: Steel plate.

## **2.03 MATERIALS**

- A. Lumber:
  1. Grade: RIS (GR), Grade standard.
  2. Moisture Content: Between 7 and 9 percent.
    - a. Machine stress rate and grade stamp each piece.
    - b. Moisture content: Not more than 19 percent at time of fabrication.
    - c. Dressed S4S.
  3. Lumber fabricated from old growth timber is not permitted. Conform to US Product Standard PS20; grade stamped by an agency certified by the Board of Review of the American Lumber Standards Committee.
  4. Provide sustainably harvested lumber, certified or labeled as specified in Section 01 60 00.
- B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.
- C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

## **2.04 ACCESSORIES**

- A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, any species, construction grade, 19 percent maximum and 7 percent minimum moisture content.
- B. Fasteners: Electrogalvanized steel, type to suit application.

## **2.05 FABRICATION**

- A. Fabricate trusses to achieve structural requirements specified.
- B. Brace wood trusses in accordance with TPI DSB-89 and BCSI 1.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that supports and openings are ready to receive trusses.

### **3.02 PREPARATION**

- A. Coordinate placement of bearing items.

### **3.03 ERECTION**

- A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete. Final as built and erection notes shall be accurately kept and turned over to the General Contractor.
- B. Set members level and plumb, in correct position.
- C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.
- D. Do not field cut or alter structural members without approval of Architect.
- E. Install permanent bridging and bracing.
- F. Install headers and supports to frame openings required.
- G. Frame openings between trusses with lumber in accordance with Section 06 10 00.
- H. Coordinate placement of decking with work of this section.

### **3.04 TOLERANCES**

- A. Framing Members: 1/2 inch maximum, from true position.

**END OF SECTION**





**SECTION 06 20 00  
FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Finish carpentry items.
- B. Wood casings and moldings.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI A135.4 - Basic Hardboard 2012 (R2020).
- C. ANSI A208.1 - American National Standard for Particleboard 2016.
- D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- F. ASTM C1036 - Standard Specification for Flat Glass 2016.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- I. AWI (QCP) - Quality Certification Program Current Edition.
- J. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).
- K. AWMAC (GIS) - Guarantee and Inspection Services Program Current Edition.
- L. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 4.0 2021.
- M. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.
- N. BHMA A156.9 - American National Standard for Cabinet Hardware 2015.
- O. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber 1996a (Validated 2013).
- P. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.
- Q. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- R. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress 2015.
- S. PS 1 - Structural Plywood 2009 (Revised 2019).
- T. PS 20 - American Softwood Lumber Standard 2020.
- U. WDMA I.S. 4 - Industry Specification for Preservative Treatment for Millwork 2015a.
- V. WI (CCP) - Certified Compliance Program (CCP) Current Edition.
- W. WI (CSIP) - Certified Seismic Installation Program (CSIP) Current Edition.
- X. WI (MCP) - Monitored Compliance Program (MCP) Current Edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with plumbing rough-in, electrical rough-in, installation of associated and adjacent components, and related.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

- B. Product Data:
  1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
  2. Provide data on fire retardant treatment materials and application instructions.
  3. Provide instructions for attachment hardware, finish hardware, and related.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
  3. Include certification program label.
- D. Samples: Submit two samples of wood trim 6 inches long or as standard practice.

## **1.06 QUALITY ASSURANCE**

- A. Fabricators:
  1. Perform work in accordance with Woodwork Institute Manual of Millwork, grades as indicated.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- C. Quality Certification:
  1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  2. Provide labels or certificates indicating that the work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  3. Provide designated labels on shop drawings as required by certification program.
  4. Provide designated labels on installed products as required by certification program.
  5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

## **1.07 MOCK-UP**

- A. Locate where directed.
- B. Mock-up may remain as part of the Work.

## **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C. Protect from moisture damage.
- D. Handle materials and products to prevent damage to edges, ends, or surfaces.

## **PART 2 PRODUCTS**

### **2.01 FINISH CARPENTRY ITEMS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

### **2.02 WOOD-BASED COMPONENTS**

- A. Provide sustainably harvested wood, certified or labeled as specified in Section 01 60 00 - Product Requirements.
- B. Wood fabricated from old growth is not permitted.

### **2.03 LUMBER MATERIALS**

- A. Hardwood Lumber: red oak species, plain sawn, maximum moisture content of 6 percent ; with vertical grain , of quality suitable for transparent finish.
  1. Wood Base: Ranch style, 3 1/2" high; field verify to match existing profile and height.
  2. Color: To match existing facility wood doors.

#### **2.04 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.
- C. Fasteners: Of size and type to suit application; standard finish in concealed locations and standard finish in exposed locations.
- D. Concealed Joint Fasteners: Threaded steel, or hardwood biscuits.

#### **2.05 ACCESSORIES**

- A. Lumber for Shimming, Blocking, and furring: Softwood lumber of indicated species.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

#### **2.06 HARDWARE**

- A. Hardware: Comply with BHMA A156.9.

#### **2.07 FABRICATION**

- A. All paneling, casework, benches, display cases, etc. shall be fabricated in accordance with Architectural Woodwork Standards 1st edition. Coordinate glass items with section 08 80 00.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

#### **2.08 SHOP FINISHING**

- A. Apply wood filler in exposed nail and screw indentations.
- B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
- D. Back prime woodwork items to be field finished, prior to installation.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.
- C. See Section 06 10 00 for installation of recessed wood blocking.

#### **3.02 INSTALLATION**

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. All finished work shall be scribed and coped as required for an accurate fit and erected plumb, true, square and in accordance with the drawings. Correlate location of nailers, blocking grounds and similar supports to allow proper attachment or other work. All work shall be secured in place with screws or nails as required. Countersink and fill all nail and screw heads exposed to view.
- E. This Contractor shall furnish and install all nails, spikes, screws, bolts and other similar items of rough hardware required in the progress of his work and shall install all items of finish hardware furnished by others.

- F. Install moldings to the following standards:
  - 1. Moldings to receive transparent finish shall be selected for compatibility of grain and color.
  - 2. No warped or twisted molding shall be allowed.
  - 3. All moldings to be set plumb, level and true.
  - 4. Moldings and trim shall be installed in maximum lengths possible to minimize joints.
  - 5. All field joints to be tightly fitted and flush.
  - 6. Field joints in running trim to be diagonal ("scarfed") joints.
  - 7. Exposed ends of running trim shall have profiled or self-mitered returns.
  - 8. All exposed fastenings (nails or trim head screws) shall be deep set.
  - 9. Miters on large members (4" or larger) shall be doweled or splined and glued.
  - 10. Blind nailing and concealed type fasteners to be used whenever possible.
  - 11. Cope or miter inside corners where applicable, to produce tight fitting joints.
  - 12. Miter outside joints to produce tight fitting joints.
- G. Install indicated items as shown on drawings, level and plumb.
- H. Install hardware in accordance with manufacturer's instructions.

### **3.03 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

**END OF SECTION**

**SECTION 06 41 00**  
**ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Countertops & window sills.
- C. Cabinet Hardware.
- D. Solid Surface Fabrications

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 20 00 - Finish Carpentry: Related work.

**1.03 REFERENCE STANDARDS**

- A. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 4.0 2021.
- B. BHMA A156.9 - American National Standard for Cabinet Hardware 2015.
- C. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber 1996a (Validated 2013).
- D. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.
- E. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.

**1.06 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- B. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

**1.07 MOCK-UP**

- A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from moisture damage.

**1.09 FIELD CONDITIONS**

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

**PART 2 PRODUCTS**

**2.01 CABINETS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

- B. Plastic Laminate Faced Cabinets: Custom grade.
  - 1. Finish - Exposed Exterior Surfaces: PLAM
  - 2. Finish - Exposed Interior Surfaces: PLAM
  - 3. Finish - Concealed Surfaces: Melamine
  - 4. Door and Drawer Edge Profiles:
    - a. Square edge with 3 MM PVC applied edgebanding
  - 5. Casework Construction Type: Type A - Frameless.
  - 6. Adjustable Shelf Loading: 50 lbs. per sq. ft.
    - a. Deflection: L/144.
  - 7. Cabinet Style: Flush overlay.
  - 8. Cabinet Doors and Drawer Fronts:
    - a. Drawer Side Construction: Multiple-dovetailed.
    - b. Drawer Construction Technique: Dovetail joints.

## 2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Provide sustainably harvested wood, certified or labeled as specified in Section 01 60 00.

## 2.03 PANEL MATERIALS

- A. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.
- B. Particleboard: ANSI A208.1; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips, medium density, made with moisture resistant; of grade to suit application; sanded faces.

## 2.04 LAMINATE MATERIALS

- A. Manufacturers:
  - 1. Arborite; ColorEdge: [www.arborite.com/#sle](http://www.arborite.com/#sle).
  - 2. Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
  - 3. Panolam Industries International, Inc; Nevamar Standard HPL: [www.panolam.com/#sle](http://www.panolam.com/#sle).
  - 4. Wilsonart LLC: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as indicated.
  - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as indicated, finish as indicated.
  - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as indicated, finish as indicated.
  - 3. Flame Retardant Surfaces: HGF, 0.048 inch nominal thickness, through color, colors as indicated, finish as indicated.
  - 4. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as indicated, finish as indicated, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

## 2.05 COUNTERTOPS

- A. Quality Standards: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) OR AWMAC/WI.
- B. Window Sills shall be fabricated to the size and configuration shown on drawings.
- C. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated with 3mm PVC edge-banding.
- D. Solid Surfacing Countertops & Window Sills: Solid surfacing sheet or plastic resin casting over continuous substrate.
  - 1. Flat Sheet Thickness 1/2" (12 mm).

2. Solid Surfacing Sheet & Plastic Resin Castings: Complying with ISFA 201 and NEMA LD.
3. Acrylic or Polyester Resin, Mineral Filler, and Pigments: Homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
  - a. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
4. Other Components Thickness: ½" minimum.
5. Edges, Backs and End Splashes: Same sheet material, square top, minimum 4 inches high.
6. Color to be selected from Corian Price Group B.

## **2.06 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
  1. GSA CID A-A-1936 contact adhesive.
- B. 3mm PVC banding, machine applied with waterproof hot melt adhesive with external edges and outside corners of doors and drawer fronts, and countertops, machine profiled to 1/8" radius for safety.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- D. Grommets: plastic material for cut-outs. Outwater Plastics #35-3 or equal, 3 inch diameter grommet.
- E. Steel Angle Support for wide openings in countertops shall be 3/4 x 3/4 x 1/8 inch steel angles.
- F. Counter Support Brackets: Metal angle support brackets with 3" x 3" x 45 degree notch at the wall for wall cleat and wire run clearance. Brackets shall be fabricated from 1/8 inch thick steel and shall be 24 x 29 inches, finished in a textured powder coat, color as selected by Architect from manufacturer's standard line of colors. Counter Support Brackets shall be as manufactured by Wizard Products; 800-286-5471.
- G. Fasteners: Size and type to suit application.
- H. Concealed Joint Fasteners: Threaded steel.

## **2.07 HARDWARE**

- A. Shelf Brackets: 1/8" diameter steel pins that fit into predrilled holes in the cabinet sides. Pins to have a flattened exposed surface to support the shelf.
- B. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, black finish locks at wood cabinets, chrome finish locks at plam cabinets.
- C. Catches: Magnetic.
- D. Drawer Slides:
  1. Type: Full extension.
  2. Static Load Capacity: Commercial grade.
  3. Mounting: Side mounted.
  4. Stops: Integral type.
  5. Features: Provide self-closing/stay closed type.
- E. Hinges: Concealed European style, steel with chrome finish, soft-close.
- F. Door/Drawer Pulls: Fabricator's standard wire pulls.

## **2.08 FABRICATION**

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

- B. All casework shall conform to the standards of the Architectural Woodworking Institute - Section 10 Casework, Custom Grade, Flush Overlay Design. All body members and tops shall be thickness as shown on the drawings or as specified herein, medium density fiberboard or plywood covered on the exposed side with decorative plastic laminate and unexposed side with laminate backing sheet. Wood veneer shall be glued to the particle board under pressure.
- C. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- D. Door and Drawer Fronts: 3/4 inch thick; flush style.
- E. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.
- F. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- G. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.
- H. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

#### **3.02 INSTALLATION**

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use concealed joint fasteners to align and secure adjoining cabinet units.
- C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

#### **3.03 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

#### **3.04 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

#### **3.05 SCHEDULES**

**END OF SECTION**



**SECTION 07 11 13  
BITUMINOUS DAMPPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Bituminous dampproofing.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 21 00 - Board Insulation: Rigid insulation board used as protection board.

**1.03 REFERENCE STANDARDS**

- A. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011 (Reapproved in 2016).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

**1.06 FIELD CONDITIONS**

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

**PART 2 PRODUCTS**

**2.01 DAMPPROOFING PRODUCTS**

- A. W.R. Meadows; Product Sealmatic Type I Spray Grade, Emulsion Type.
- B. Other Acceptable Manufacturers:
  - 1. Karnak Chemical Corp - #100AF Non-Fibrated Emulsion Coating [www.karnakcorp.com](http://www.karnakcorp.com).
  - 2. Henry Company - 788 Premium Foundation Coating.
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 COLD ASPHALTIC MATERIALS**

- A. Asphalt Primer: 1, compatible with substrate.
- B. Spray On Bitumen: Emulsified asphalt, ASTM D1187 Type I, and ASTM D1227, Type III Class 1 unreinforced (Type III).

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

**3.02 PREPARATION**

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.
- E. Fill voids, cracks and holes in concrete or masonry with cement mortar and allow to dry.

### **3.03 APPLICATION**

- A. Prime surfaces in accordance with manufacturer's instructions and allow to dry prior to application of dampproofing.
- B. Apply bitumen by spray application.
- C. Apply bitumen in one coat, continuous and uniform, at a rate of 2-3 gallons per 100 square feet.
- D. Apply from 2 inches below finish grade elevation down to top of footings, including footing.
- E. Seal items projecting through dampproofing surface with mastic. Seal watertight.
- F. Coating shall be continuous and free of pinholes or holidays. Cover all slots, joints and grooves and apply into all chases and corners.
- G. Allow coating to dry minimum of 48 hours prior to backfilling.
- H. Place insulation protection board as specified in Section 07 21 00 directly over dampproofing prior to backfilling.

### **3.04 SCHEDULE**

- A. Foundation Wall at areas with no below grade occupancy. One coating of asphalt dampproofing.

**END OF SECTION**

**SECTION 07 13 00  
SHEET WATERPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet membrane waterproofing.
- B. Drainage panels and Protection boards.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 21 00 - Thermal Insulation: Insulation used for protective cover.
- B. Section 31 23 23 - Fill.

**1.03 REFERENCE STANDARDS**

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers- Tension; 2006a.
- B. ASTM D4551 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane; 1996 (Reapproved 2008).
- C. ASTM E96/E96M - Standard Test Methods For Water Vapor Transmission of Materials; 2010.
- D. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

**1.05 QUALITY ASSURANCE**

**1.06 FIELD CONDITIONS**

- A. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until liquid or mastic accessories have cured.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Contractor shall correct defective Work within a two year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.
- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Grace Construction Products; Product Bituthane 4000.
- B. Other Acceptable Laminated Composite Manufacturers:
  - 1. Grace Construction Products; Product Bituthane 4000: [www.na.graceconstruction.com](http://www.na.graceconstruction.com).
  - 2. W.R. Meadows, Inc; Product Mel-Rol: [www.wrmeadows.com](http://www.wrmeadows.com).
  - 3. Carlisle; Product CCW-701.
  - 4. Mirafi - Miradri 860/861

5. Karnak - Karnak Elasto Ply
6. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 MEMBRANE MATERIALS**

- A. Composite Laminate Membrane: Comprised of 56 mils thickness of Rubberized Asphalt and a 4 mils thickness of Polyethylene Film; 1/16 inch total thickness.
  1. Sheet Width: 36 inch, minimum.
  2. Tensile Strength, Membrane: 325 psi, measured in accordance with ASTM D 412.
  3. Ultimate Elongation: 300 percent, measured in accordance with ASTM D412.
  4. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
  5. Water Vapor Permeability: 0.05 perm inch, measured in accordance with ASTM E96/E96M.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Sealant: As recommended by membrane manufacturer.
- D. Termination Bars: membrane type sealer as recommended by the membrane manufacturer; compatible with membrane and adhesives.
- E. Surface Conditioner: Water-based Latex type, compatible with membrane.
- F. Adhesives: As recommended by membrane manufacturer.

## **2.03 ACCESSORIES**

- A. Protection Board: Rigid insulation specified in Section 07 21 00.
- B. Flexible Flashings: Type recommended by membrane manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

### **3.02 PREPARATION**

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Seal cracks and joints with sealant using depth to width ratio in accordance with Section 07 90 05.
- E. Waterproofing Concrete Block Walls:
  1. The block surface should be smooth and free from projections. Trowel cut all mortar joints flush to the face of the concrete block. Fill all voids and holes. If these conditions aren't met, cover block with a parge coat (typically one part cement to 3 parts sand) finished to a smooth steel trowel surface.
  2. Tightly grout all penetrations prior to installing the waterproofing.
  3. The block must be thoroughly dry before installing the waterproofing. Because of the porosity of the block, water can wick through much of the wall. Moisture in the block wall is usually detectable due to a discoloration of the block. If concrete or grout is poured in the core of the block allow 3 days of drying prior to installing the waterproofing. Use Bituthane Primer B2 if the block is damp.
  4. Immediately roll all membrane completely and firmly with a hand roller upon application. Press the top termination of membrane firmly to the wall with a blunt tool such as the handle of a hammer or secure the membrane into a reglet.
  5. Apply a troweled bead of Bituthane Mastic to all vertical and horizontal terminations.

6. When necessary, provide temporary weather protection, such as plastic or tarpaulin, over the top of the wall to prevent precipitation from accumulating in the core of the block.
- F. Apply surface conditioner at a rate of 300 sq. ft./gallon. Protect conditioner from rain or frost until dry. Surface conditioner should not be applied so heavily that it puddles or runs. Do not apply conditioner to the membrane.

### **3.03 INSTALLATION - MEMBRANE**

- A. Install membrane waterproofing in accordance with manufacturer's instructions.
- B. Corner Details: At all inside corners, apply a 3/4 inch fillet of Grace LM2 and extend out onto the adjoining surfaces a minimum of 2-1/2 inches.
  1. Where footing meets wall apply membrane over fillet and out to the outer edge of the footing. Cover termination of membrane with Grace LM2 applied at 3/32 inch thickness applied over the edge of the membrane and down the face of the footing as recommended by the manufacturer.
- C. Roll out membrane. Minimize wrinkles and bubbles.
- D. Self-Adhering Membrane: Remove release paper layer. Roll out on substrate with a hand roller to encourage full contact bond.
  1. Apply membrane in lengths up to 8 feet. Overlap all seams at least 2 inches. On higher walls apply membrane in two or more sections with the upper overlapping the lower by at least 2 inches.
  2. Terminate membrane at grade level. Press the top termination of membrane firmly to the wall with a blunt tool such as the handle of a hammer or secure the membrane into a reglet.
  3. Apply Grace LM2 termination over the edge of the membrane at 3/32 inch thickness as recommended by the membrane manufacturer.
  4. Protrusions and penetrations shall be sealed with Grace LM2 as per manufacturer's instructions.

**END OF SECTION**



**SECTION 07 21 00  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation at perimeter foundation wall, exterior wall behind indicated wall finish, and areas indicated on drawings.
- B. Batt insulation in wall, ceiling, and roof construction, areas noted on .
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.
- B. Section 07 84 00 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.
- C. Section 31 23 23 - Fill: Support for board insulation below grade.

**1.03 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

**1.05 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 FOAM BOARD INSULATION MATERIALS**

- A. Extruded Polystyrene Board Insulation: ASTM C 578, Type IV; Extruded polystyrene board with natural skin surfaces; with the following characteristics:
  - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  - 3. Board Size: 48 x 96 inch (1220 x 2440 mm).
  - 4. Board Thickness: as shown on drawings.
  - 5. Board Edges: Square.
  - 6. Thermal Conductivity (R-Value): Standard.
  - 7. Compressive Resistance: 25 psi (173 kPa).
  - 8. Water Absorption, maximum: 0.1 percent, volume.
  - 9. Manufacturers:
    - a. Dow Chemical Co: Square Edge
    - b. Owens Corning Corp: Foamular 250
    - c. Greenguard: CM Insulation Board
    - d. Minnesota Diversified Products Inc.: Certifoam.
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Extruded Polystyrene Board Insulation (High Load): ASTM C 578, Type VI, Extruded polystyrene board with natural skin surfaces; with the following characteristics:
  - 1. Board Size: 48 x 96 inch.
  - 2. Board Thickness: as shown on drawings.

3. Board Edges: Square.
  4. Thermal Conductivity (R-Value): 5 per inch.
  5. Compressive Resistance: 40 psi.
  6. Water Absorption, Maximum: 0.1 percent, volume.
  7. Manufacturers:
    - a. Dow Chemical Co.: High Load 40
    - b. Owens Corning Corp: Foamular 400
- C. Extruded Polystyrene Board Insulation for interior "Z" stud applications: ASTM C 578, Type X, extruded polystyrene board with natural skin surfaces and the following characteristics:
1. Board Size: 23-7/8 x 96 inch.
  2. Board Thickness: 2 inches.
  3. Board Edges: Square.
  4. Thermal Conductivity: (R Value): 5 per inch.
  5. Compressive Resistance: 15 psi.
  6. Manufacturer's:
    - a. Dow Chemical Co.: Styrofoam Z-Mate.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Extruded Polystyrene Board Insulation Foundation Dampproofing Protection Board: ASTM C272 Water Absorption of Core Materials for Structural Sandwich Constructions; with the following characteristics:
1. Board Size: 48" x 50 feet.
  2. Board Thickness: 1/4 inch.
  3. Thermal Conductivity (R-Value): 1.0.
  4. Compressive Resistance: 8 psi.
  5. Water Absorption: 0.2%.
  6. Manufacturers:
    - a. Dow Chemical Co.: DOW Protection Board III.
    - b. Owens Corning: Fanfold DWB.

## **2.02 FOAM BOARD INSULATION MATERIALS**

- A. Expanded Polystyrene (EPS) Board Insulation: Complies with ASTM C578.
1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
- B. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
- C. Extruded Polystyrene (XPS) Continuous Insulation (CI) Board: Complies with ASTM C578, and manufactured using carbon black technology.
1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  3. Board Size: 48 inch by 96 inch.
  4. Board Thickness: 1-3/4 inch.
  5. Board Edges: Shiplap, at long edges.

## **2.03 BATT INSULATION MATERIALS**

- A. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
1. Thermal Resistance: R of standard.
  2. Thickness: as shown on drawings.



3. Facing: Unfaced.
4. Manufacturers:
  - a. CertainTeed Corporation: High Performance Batt Insulation
  - b. Johns Manville International, Inc: Unfaced Insulating Blankets
  - c. Owens Corning Corp: Pink Fiberglass R-21 Thermal Insulation
  - d. Guardian Fiberglass, Inc. - R-Best High Density Batts.

## **2.04 ACCESSORIES**

- A. Sheet Vapor Retarder: Specified in Section 07 25 00.
- B. Exposed Foundation Insulation Coating: Pre-Mixed 100% Acrylic foundation insulation coating system with reinforcing mesh. Foundation coating system shall be furnished in standard Grey color. Foundation coating system shall be TUFF II as manufactured by Styro Industries; P.O. Box 8098 Madison, WI 53708; www.styro.net; or equal.
- C. Insulation Fasteners: Fasteners for holding above grade foundation insulation to wall shall be expansion type anchors with integral plastic disc washers made specifically to hold insulation in place. Insulation fasteners shall be Styro Tapit Fasteners as manufactured by Styro Industries; P.O. Box 8098 Madison, WI 53708; www.styro.net; or equal.
- D. Adhesive: Type recommended by insulation manufacturer for application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Install boards vertically on foundation perimeter.
  1. Place boards to maximize adhesive contact.
  2. Install in running bond pattern.
  3. Butt edges and ends tightly to adjacent boards and to protrusions.
  4. Install rigid insulation at the perimeter foundation wall from top of footings to just below grade as shown on drawings against masonry or concrete walls after waterproofing and drainage board has been installed, just prior to backfilling operations.
  5. Support insulation as required until sufficient pressure of backfill will hold insulation in place without displacement.
  6. Insulation shall be installed in parallel courses with end joints staggered. Joints shall be tightly butted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Foundation Wall with Foundation Insulation Coating:
  1. Foundation wall where insulation is above grade and will be coated shall be dampproofed prior to insulation application. After dampproofing has cured, apply insulation using dampproofing as an adhesive in accordance with dampproofing manufacturer's recommendations. Insulation should be installed with writing to the wall surface to prevent bleed through in the coating. Install Tapit fasteners in accordance with manufacturer's to positively old insulation in place.
  2. Prior to installing insulation coating insulation surface shall be lightly etched with a wire brush to remove any dust or oxidation. Insulation surface shall be dry prior to installing coating.
  3. Install sticky mesh to the insulation surface in accordance with manufacturer's instructions. Press sticky mesh onto the surface horizontally. Cover the entire exposed surface overlapping the sticky mesh a minimum of 1 inch.
  4. Stir coating well before installing. Apply the first coat the first coat of TUFF II using a towel, drywall blade or hoper style sprayer in a 1/16 inch thick, smooth, even coat. Allow the mesh to gauge the thickness of the coat so you can barely see the mesh pattern under the first coat.

5. Allow the coating to dry at least 1 - 4 hours, or until it will take thumb pressure without coming off.
6. Apply the second coat of TUFF II using a trowel or hopper style sprayer in a 1/16 inch thick texture coat. The desired texture must be achieved while the coating is fresh and wet. It is advisable to immediately texture a freshly applied 3-foot area of wall before moving on to the next 3-foot area. Verify texture pattern with Architect prior to starting. Complete work to a natural stopping point such as an inside or outside corner, avoid stopping in the middle of the wall.
7. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.03 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Install boards vertically on walls.
- B. Adhere insulation to masonry walls with adhesive as recommended by manufacturer.
- C. Install boards between metal "Z" studs as specified in Section 09 21 16. Boards shall be tightly butted to each stud.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.04 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install batt insulation into the hollow ends of precast concrete planks to the depth shown on drawings. Insulation shall be packed with sufficient density to hold it in place but not so tight as to impair its effectiveness.
- C. Install in exterior wall, roof, and ceiling spaces without gaps or voids. Do not compress insulation.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- F. Coordinate work of this section with requirements for vapor retarder specified in Section 07 25 00.

### **3.05 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

**SECTION 07 21 19**  
**FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Foamed-in-place insulation.
  - 1. In areas shown on drawings.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2012.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2011.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, details, and perimeter conditions requiring special attention.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum 3 years of experience.

**1.07 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for flame and smoke limitations.

**1.08 FIELD CONDITIONS**

- A. Do not install insulation when ambient temperature is lower than 70 degrees F.
- B. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- C. Do not apply foam when temperature is within 5 F of dew point.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Foamed-In-Place Insulation:
  - 1. Bayer MaterialScience; EcoBay CC: [www.spf.bayermaterialscience.com](http://www.spf.bayermaterialscience.com).
  - 2. NCFI Polyurethanes; Product InsulBloc Commercial Polyurethane Insulation: [www.ncfi.com](http://www.ncfi.com).
  - 3. BASF Spraytite 81206

4. Gaco Onepass
5. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 MATERIALS**

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, open or closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  1. Aged Thermal Resistance (R-value): 6.1 (deg F hr sq ft)/Btu, minimum, when tested at 1 inch thickness in accordance with ASTM C518 after aging for 180 days at 41 degrees F.
  2. Water Vapor Permeance: Vapor retarder; 3.0 perm, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
  3. Water Absorption: Less than 5 percent by volume, maximum, when tested in accordance with ASTM D2842.
  4. Air Permeance: 0.004 cfm/sq ft, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.5 psf.
  5. Closed Cell Content: At least 90 percent.
  6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
  7. Core Density (ASTM D 1622): Nominal 2 pcf.
  8. Compressive Strength minimum (ASTM D 1621, 10% parallel to rise): 25 psi.

## **2.03 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.

## **PART 3 EXECUTION**

### **3.01 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Preparation:
  1. Mask and cover adjacent areas to protect from overspray.
  2. Apply primers for special conditions as recommended by the manufacturer.
  3. Cover wide joints with transition sheet membrane as recommended by the spray foam manufacturer.
  4. Clean work area prior to application of sprayed insulation.
  5. Verify substrate temperature meets manufacturer's requirements for specific formulations used.
  6. Ensure that all stud cavity fire-stopping is installed prior to application of spray foam.
- C. Application: Spray apply polyurethane foam in accordance with ASTM C 1029 and manufacturer's installation guidelines; complying with preparation methods recommended by the manufacturer.
  1. Apply spray polyurethane foam by picture framing around the interior studs at the insulated sheathing - steel stud interface and one pass across all board joints and penetrations.
  2. Finish applying spray polyurethane foam with each pass not exceeding manufacturers maximum thickness. Final thickness as indicated on drawings.
  3. Avoid formation of sub-layer air pockets.
  4. Apply spray polyurethane foam in overlapping layers, in a manner to obtain a smooth, uniform surface. Total thickness as indicated.
  5. Maintain 3 inch clearance around chimneys, heating vents, steam pipes, recessed lighting fixtures and other heat sources.
  6. Do not apply spray polyurethane foam to inside of exit openings or electrical junction boxes.
  7. Maintain a continuous layer of spray foam from floor to floor to roof to complete air barrier.
  8. Site tolerances: Maximum variation in applied thickness - minus 1/4 inch, plus 5/8 inch.

**END OF SECTION**

**SECTION 07 21 26**  
**BLOWN INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ceiling: Loose insulation pneumatically placed.
- B. CONTRACTORS OPTION: Insulation at ceiling spaces shall be either Blown-In Fiberglass insulation as specified herein or Fiberglass Batt Insulation as specified in Section 07 21 00.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 21 00 - Thermal Insulation.

**1.03 REFERENCE STANDARDS**

- A. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation; 2011.
- B. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation; 2006 (Reapproved 2011)e1.

**1.04 SYSTEM DESCRIPTION**

- A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements, in conjunction with Section 07 21 00.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, limitations, and Recommended thicknesses.

**1.06 PROJECT CONDITIONS**

- A. Coordinate the work with Section 07 21 00 for placement of insulation materials.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Blown Insulation:
  - 1. CertainTeed Corporation; Product InsulSafe 4 Fiberglass Blowing Insulation: [www.certainteed.com](http://www.certainteed.com).
  - 2. Guardian Fiberglass; Product Loose-Fill Blowing Wool.
  - 3. Johns Manville Corporation; Product Climate Pro Loose Fill Insulation: [www.jm.com](http://www.jm.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Loose Fill Insulation: ASTM C764, glass fiber type, bulk for pneumatic placement.
  - 1. Installed Thickness: 15 inches or as shown on drawings.
- B. Insulation Baffles: Insulation venting panels for use with blowing fiberglass insulation at the eave line of roof trusses shall be a corrugated polystyrene foam, "Air Chute" or equal.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.
- B. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.
- C. Verify spaces are unobstructed to allow placement of insulation.

**3.02 INSTALLATION**

- A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.

- B. Place insulation pneumatically to completely fill rafter and truss spaces.
- C. Place insulation against baffles. Do not impede natural attic ventilation to soffit.
- D. Completely fill intended spaces. Leave no gaps or voids.

**3.03 CLEANING**

- A. Remove loose insulation residue.

**END OF SECTION**

**SECTION 07 24 00**  
**EXTERIOR INSULATION AND FINISH SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Drainable Class PB composite wall cladding of rigid insulation and applied coating.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing: Sheathing on metal studs.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Perimeter flashings.
- C. Section 07 90 05 - Joint Sealers: Perimeter and penetration sealants.

**1.03 SYSTEM DESCRIPTION**

- A. Plans and specifications are based on the Dryvit Outsulation X System (high impact with panzer reinforcement mesh), Class PB, utilizing a cavity wall concept with a capability for moisture drainage. The system consists of a secondary weather resistive barrier, vertically applied spray adhesive, expanded polystyrene insulation board, base coat, reinforcing mesh and Finish.
  - 1. Design Requirements:
    - a. Substrate: Silicone treated gypsum core sheathing surfaced with inorganic fiberglass mats meeting ASTM C 1177.
  - 2. Deflection of the substrate system shall not exceed 1/240 times the span.
  - 3. The substrate shall be flat within 1/4 inch in a 4 foot radius.
  - 4. The slope of inclined surfaces shall not be less than 6:12, and the length shall not exceed 12 inches.
  - 5. All zones requiring an impact resistance rating higher than Level 1, as defined by EIMA Standard 101.86, shall be as indicated on the drawings.
  - 6. Expansion Joints:
    - a. Where expansion joints occur in the substrate system.
    - b. Where building expansion joints occur.
    - c. At floor lines where significant movement is expected.
    - d. Where the Outsulation Plus System abuts dissimilar materials.
    - e. Where the substrate changes.
    - f. Where prefabricated panels abut one another.
    - g. In continuous elevations at intervals not exceeding 75 feet measured horizontally.
    - h. Where significant structural movement occurs such as changes in roof line, building shape or structural system.
  - 7. Terminations:
    - a. The system shall be held back from adjoining materials around penetrations such as windows, doors, and mechanical equipment a minimum of 3/4 inch for sealant application.
    - b. The system shall be terminated a minimum of 8 inches above finished grade.
  - 8. Sealants shall be compatible with the System. Backer rod shall be closed cell foam.

**1.04 REFERENCE STANDARDS**

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011.
- B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.
- C. ASTM D 968 - Abrasion Resistance: No deleterious effects after 132 gallons.
- D. Absorption, Freeze-Thaw: 60 cycles, soak at 68 degrees F for four days, then 14 degrees F for two hours, no checking, cracking or splitting.
- E. ASTM G 23 - Accelerated Weathering: 2000 hours, no deterioration.
- F. Mildew Resistance: Mil Standard 810B, passes.

- G. ASTM B 117 - Salt Spray Resistance: 5% concentration for 300 hours, no deleterious effects.
- H. ASTM E 283 - Air Leakage: Less than 0.001 cfm/sqft. Classified as Type III air barrier as defined by the National Research Council of Canada.
- I. ASTM E 331 - Water Penetration: no water penetration to the inner most surface of the test specimen.
- J. ASTM E331, Modified - Moisture Drainage Efficiency: 95% efficiency.
- K. ASTM E 96 Procedure B; Standard Lamina - Water Vapor Transmission: 14 gr/hr/sqft.
- L. ASTM C 297 - Tensile Bond Strength: Backstop to Densglass Gold, 28.8 psi, sheathing facer failure. Genesis to Backstop 15.1 psi.
- M. ASTM E 330 - Full Scale Structural Test: Minimum failure load under positive pressure or negative load of 90 psf unless otherwise specified, substrate failure.
- N. Impact Resistance: In accordance with EIMA Standard 101.86, Levels 1 & 3.
- O. ASTM E 108 - Modified Full Scale Fire Test: passed.
- P. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage; 2013.
- Q. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2005 (Reapproved 2010).
- R. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2011.
- S. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- T. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- U. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2003 (Reapproved 2011).
- V. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS); 2013.
- W. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- X. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- Y. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems; 2009.
- Z. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies; 2004 (Editorially revised 2009).
- AA. NFPA 259 - Standard Test Method for Potential Heat of Building Materials; 2013.
- AB. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2012.
- AC. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.
- C. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
- D. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.



- E. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

#### **1.06 QUALITY ASSURANCE**

- A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site at all times during installation.
- B. EIFS Manufacturer Qualifications: Provide EIFS products other than insulation from the same manufacturer with qualifications as follows:
  - 1. Member in good standing of EIMA (EIFS Industry Members Association).
  - 2. Manufacturer of EIFS products for not less than 5 years.
- C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.
- D. Installer Qualifications: Company specializing in EIFS work, with minimum three years of documented experience, and approved by manufacturer.

#### **1.07 MOCK-UP**

- A. Construct mock-up of typical EIFS application on specified substrate, size as indicated on drawings, and including flashings, joints, and edge conditions.
- B. Locate mock-up where directed.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
- B. Storage: Store materials as directed by manufacturer's written instructions.

#### **1.09 FIELD CONDITIONS**

- A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.
- B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.
- C. Do not install coatings or sealants when ambient temperature is below 40 degrees F.
- D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

#### **1.10 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.
- C. Provide separate warranty from installer covering labor for repairs or replacement for a period of not less than two.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Other Acceptable Manufacturers: Basis of design – Dryvit Outsulation X System; High Impact with Panzer Reinforcement Mesh.
- B. Other acceptable Manufacturers:
  - 1. Parex USA, Inc.; Product Water Master Commercial-VR: [www.parex.com](http://www.parex.com).
  - 2. BASF Wall Systems (Senergy, Finestone, Acrocrete, SonoWall) ; Product Senerflex Channeled Adhesive Design: [www.wallsystems.basf.com](http://www.wallsystems.basf.com).
  - 3. Sto Corporation.

#### **2.02 EXTERIOR INSULATION AND FINISH SYSTEM**

- A. Fire Characteristics:
  - 1. Flammability: Pass, when tested in accordance with NFPA 285.
  - 2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.

3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.
- B. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.
  - C. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.
  - D. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.
  - E. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC219 or AC235.
  - F. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycle 1, 5, or 9.
  - G. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.
  - H. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.
  - I. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 500 liters of sand.
  - J. Impact Resistance: Construct system to provide the following impact resistance without exposure of broken reinforcing mesh, when tested in accordance with ASTM E2486/E2486M:
    1. Standard: 25 to 49 in-lb, for areas not indicated as requiring higher impact resistance.

## **2.03 MATERIALS**

- A. Weather Barrier: Manufacturer standard weather barrier system for under there responsible EIFS work.
- B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh.
- C. Insulation Board: Molded expanded polystyrene (EPS) board insulation, ASTM C578, Type XI, with the following characteristics:
  1. Thermal Resistance (R factor per 1 inch (25.4 mm)) at 75 degrees F: 3.60.
  2. Compressive Resistance: 10 psi.
  3. Colors:
    - a. Walls: Sand Pebble, Lite Cinnamon
    - b. Trim and Cornice: Sand Pebble, Aztec Gold
- D. Flashing Tape: Self-adhering rubberized asphalt tape with polyethylene backing or other material and surface conditioner furnished or approved by EIFS manufacturer.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.
- B. Where different requirements appear in either document, comply with the most stringent.

- C. Neither of these documents supersedes the provisions of the Contract Documents that define the contractual relationships between the parties or the scope of work.

### **3.02 EXAMINATION**

- A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.
- B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

### **3.03 PREPARATION**

- A. The Outsulation Plus materials shall be protected by permanent or temporary means from weather and other damage prior to, during, and following application until dry.
- B. Substrate shall be prepared as to be free of foreign materials such as oil, dust, dirt, form-release agents, efflorescence, paint, wax, water repellants, moisture, frost, and any other condition that may inhibit adhesion.

### **3.04 INSTALLATION - WATER-RESISTIVE BARRIER**

- A. Seal all substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.
- B. At door and window rough openings and other wall penetrations, seal water-resistive barrier and flexible flashings to rough opening before installation of metal flashings, sills, or frames, using method recommended by manufacturer.
- C. Lap flexible flashing or flashing tape at least 2 inches on each side of joint or transition.

### **3.05 INSTALLATION - INSULATION**

- A. Install insulation in accordance with manufacturer's instructions, System Application Instructions.
- B. Prior to installation of boards, install starter track and other trim level and plumb and securely fastened. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.
- C. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.
- D. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.
- E. Fill gaps greater than 1/16 inch with strips or shims cut from the same insulation material.
- F. Rasp irregularities off surface of installed insulation board.

### **3.06 CLEANING**

- A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

### **3.07 PROTECTION**

- A. Protect completed work from damage and soiling by subsequent work.

**END OF SECTION**



**SECTION 07 25 00  
WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Weather Barrier: Under exterior wall cladding, over sheathing or other substrate.
- B. Vapor Retarders: Materials to make exterior walls and ceilings water vapor-resistant.
- C. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing: Water-resistive barrier under exterior cladding.
- B. Section 06 10 00 - Rough Carpentry: Water-resistive barrier under exterior cladding
- C. Section 07 21 00 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
- D. Section 07 90 05 - Joint Sealers: Sealant materials and installation techniques.

**1.03 DEFINITIONS**

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
  - 1. Water Vapor Permeance: For purposes of conversion,  $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm.}$
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

**1.04 REFERENCE STANDARDS**

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2020.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- D. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- E. ICC-ES AC308 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2019.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, limitations, and information on all accessory products to be included for a complete installation.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Samples: Submit samples of materials to be used as vapor barrier, sample size shall be 6 inches square.
- E. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

## **1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: Company accredited and certified under the Air Barrier Association of America (ABAA) Quality Assurance Program (QAP).

## **1.07 ADMINISTRATIVE REQUIREMENTS**

- A. After product has been selected, applicator or said contractor to comply with technical training by manufacturer for proper installation practices, etc.
- B. Upon completion of the installation by the applicator. Product manufacturer to provide certification that all work has been done in strict accordance with the contract specifications and manufacturer's requirements, an inspection shall be made by a Technical Representative of product(s) manufacturer to review the installed system.

## **1.08 QUALITY ASSURANCE**

- A. Vapor Permeability (Perm): Measure in accordance with ASTM E 96 Procedure E.

## **1.09 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

## **PART 2 PRODUCTS**

### **2.01 WEATHER BARRIER ASSEMBLIES**

- A. BASIS OF DESIGN IS BASED ON DUPONT TYVEK WEATHER BARRIER SYSTEMS\*
- B. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
  - 1. Use building paper unless otherwise indicated.
- C. Interior Vapor Retarder:
  - 1. On inside face of studs of exterior walls, under cladding, use mechanically fastened vapor retarder sheet.

### **2.02 WATER-RESISTIVE BARRIER MATERIALS (NEITHER AIR BARRIER NOR VAPOR RETARDER)**

- A. Building Paper: Asphalt-saturated Kraft building paper complying with requirements of ICC-ES AC38 Grade D.

### **2.03 WEATHER BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)**

- A. Air Barrier Sheet, Mechanically Fastened:
  - 1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
  - 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
  - 3. Ultraviolet and Weathering Resistance: Approved in writing by manufacturer for minimum of 6 months weather exposure.
  - 4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
  - 5. Seam and Perimeter Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.
  - 6. Products:
    - a. DuPont Building Innovations; Tyvek Commercial Wrap D with Tyvek Fluid Applied Flashing - Brush Formulation, Tyvek Fluid Applied Flashing and Joint Compound, FlexWrap NF, StraightFlash, StraightFlash VF, Tyvek Wrap Caps, and Tyvek Tape: [www.dupont.com](http://www.dupont.com).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
- C. Air Barrier Coating:
  - 1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
  - 2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M, Procedure B.

## **2.04 APPLICATIONS**

- A. Inside Surface of Exterior Stud Walls: Sheet seal applied to stud faces.
- B. Outside Surface of Gypsum Sheathing: Commercial Wrap D.

## **2.05 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)**

- A. Stud Walls and Truss Type Ceilings:
  - 1. Cross Laminated polyethylene meeting the requirements of ASTM E 1745, Class C and with the following minimum characteristics:
    - a. Tensile Strength per ASTM E154, Section 9: 13.6 lbf/in.
    - b. Puncture Resistance per ASTM D 1709, Method B: 475 grams.
    - c. Permeance per ASTM E96: 0.045 perms.
  - 2. Wall and Ceiling Vapor Retarders shall be as manufactured by one of the following or approved equal:
    - a. Raven Industries Inc. - Vapor Block 10; 1812 E. Ave., Sioux Falls, SD 57104; phone 800-635-3456.
    - b. Reef Industries, Inc. - Type - 65; PO Box 750250, Houston, TX 77275-0250; phone 713-507-4200.
    - c. Stego Industries LLC - Stego Wrap 10 mil Class C, 27442 Calle Arroyo, Suite A, San Juan, CA 92675; phone 877-464-7834.

## **2.06 ACCESSORIES**

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
  - 1. Products:
    - a. DuPont Building Innovations; FlexWrap NF: [www.dupont.com](http://www.dupont.com).
    - b. DuPont Building Innovations; StraightFlash: [www.dupont.com](http://www.dupont.com).
    - c. DuPont Building Innovations; StraightFlash VF: [www.dupont.com](http://www.dupont.com).
- C. Furnish all sealants, sealing tapes, pipe boots and other accessories as required by the manufacturer for a complete installation.
- D. Thinners and Cleaners: As recommended by material manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the work of this section.

### **3.02 PREPARATION**

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive tapes, adhesives and sealants in accordance with manufacturer's instructions.

### **3.03 INSTALLATION**

- A. Install materials in accordance with manufacturer's instructions.
- B. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.
- C. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- E. Mechanically Fastened Sheets - On Exterior:
  - 1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
  - 2. Overlap seams as recommended by manufacturer but at least 6 inches.
  - 3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.

4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
  5. Install water-resistive barrier over jamb flashings.
  6. Install air barrier and vapor retarder UNDER jamb flashings.
  7. Install head flashings under weather barrier.
  8. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.
- F. Mechanically Fastened Sheets - Vapor Retarder on Interior:
1. When insulation is to be installed in assembly, install vapor retarder over insulation.
  2. Seal seams, laps, perimeter edges, penetrations, tears, and cuts with self-adhesive tape, making air tight seal.
  3. Locate laps at a framing member; at laps fasten one sheet to framing member then tape overlapping sheet to first sheet.
  4. Seal entire perimeter to structure, window and door frames, and other penetrations.
  5. Where conduit, pipes, wires, ducts, outlet boxes, and other items are installed in insulation cavity, pass vapor retarder sheet behind item but over insulation and maintain air tight seal.
- G. Coatings:
1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
  2. Use flashing to seal to adjacent construction and to bridge joints.
- H. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
  2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with at least 4 inches wide; do not seal sill flange.
  3. At openings to be filled with non-flanged frames, seal weather barrier to all sides of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
  4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
  5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
  6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

### **3.04 INSTALLATION - WALLS AND CEILINGS**

- A. Install air and vapor seal materials and assemblies in conjunction with materials described in other sections to provide continuous sealed barrier in the exterior enclosure of the building.
- B. In exterior stud-framed walls, attach sheet seal to inside stud faces with tape. Lap edges over stud faces, seal laps with tape. Lap ends onto adjacent construction; seal ends with sealant.
- C. At pipes and other penetrations vapor barrier shall be tightly fit around penetration and tape sealed to it. At electrical boxes vapor barrier shall be tucked around the back side of the box and sealed. Vapor barrier shall be fastened to the bearing plate at the buildings exterior walls and shall completely seal off the insulation from the inside of the building.
- D. At junction of exterior wall and roof lap wall sheet seal onto roofing vapor retarder and attach with tape. Seal lap with tape. Position lap seal over firm bearing.
- E. At window openings install sheet seal between frame and adjacent wall seal material and attach with adhesive. Seal laps with tape. Position lap seal over firm bearing.



- F. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.

**END OF SECTION**



**SECTION 07 31 13  
ASPHALT SHINGLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Asphalt shingle roofing compatible to sheathing substrate.
- B. Flexible sheet membranes for eave protection, underlayment, and valley protection.
- C. Associated metal flashings and accessories including roof vents, vented drip edges and ridge venting.
- D. Metal drip edge.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Roof sheathing.
- B. Section 07 62 00 – Sheet Metal Flashing and Trim; Manufactured Gutters and Downspouts.

**1.03 REFERENCE STANDARDS**

- A. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
- B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2020.
- C. ASTM D3161/D3161M - Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method); 2020.
- D. ASTM D3462/D3642M - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules; 2019.
- E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- F. ASTM D4869/D4869M - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing; 2016a.
- G. ICC-ES AC188 - Acceptance Criteria for Roof Underlayments; 2015.
- H. NRCA MS104 - The NRCA Steep Roofing Manual; National Roofing Contractors Association; 2001, Fifth Edition, with interim updates.
- I. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating material characteristics.
- C. Shop Drawings: For metal flashings, indicate specially configured metal flashings.
- D. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern; for color selection.
- E. Manufacturer's Installation Instructions: Indicate installation criteria and procedures.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with the recommendations of NRCA Steep Roofing Manual.

**1.06 MOCK-UP**

- A. Locate where directed.
- B. Mock-up may remain as part of the Work.

**1.07 FIELD CONDITIONS**

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

## **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Store products in a covered, ventilated area, at temperature not more than 110 degrees F; do not store near steam pipes, radiators, in sunlight, or in other hot location.
- C. Store bundles on flat surface to maximum height recommended by manufacturer; store rolls on end.
- D. Store and dispose of solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty for materials.
- C. Shingle to be warranted with installation on building sheathing substate. See drawings.

## **PART 2 PRODUCTS**

### **2.01 SHINGLES**

- A. Manufacturers:
  - 1. GAF ; Timberline HD Series: [www.gaf.com](http://www.gaf.com).
  - 2. Other acceptable manufacturers:
    - a. Certaineed
    - b. Atlas
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 ASPHALT SHINGLES**

- A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462/D3642M; Class A fire resistance.
  - 1. Wind Resistance: Class F, when tested in accordance with ASTM D3161/D3161M.
  - 2. Warranted Wind Speed: Not less than tested wind resistance.
  - 3. Algae Resistant.
  - 4. Self-sealing type.
  - 5. Style: Staggered edge butt.

### **2.03 SHEET MATERIALS**

- A. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.
  - 1. Manufacturers:
    - a. Grace Construction Products; Product Ice & Water Shield.
    - b. Tamko; Product Moisture Guard.
    - c. Mirafi; Product Miradri WIP.
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Underlayment: Asphalt-saturated organic roofing felt, unperforated, complying with ASTM D226/D226M, Type I ("No.15").

### **2.04 ACCESSORIES**

- A. Nails: Standard round wire shingle type, of hot-dipped zinc coated steel, 10 wire gage, 0.1019 inch shank diameter, 3/8 inch head diameter, of sufficient length to penetrate through roof sheathing or 3/4 inch into roof sheathing or decking.
- B. Plastic Cement: ASTM D4586/D4568M, asphalt roof cement.
- C. Drip Edge: Aluminum drip edge (vented) with color compatible with shingle color.
- D. Vented - Airflow vented drip edge or approved equal. Color selected by Architect.
- E. Ridge Vent: GAF COBRA Ridge Vent or GAF COBRA Rigid Vent II or equal.
- F. Gutters and Downspouts are specified in section 07 62 00. Included for one location is a chain downspout. See drawings for size and configuration.
- G. Box Ventes / Roof Louvers: GAF – Master Flow series, color selected by Architect.

## **2.05 METAL FLASHINGS**

- A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, ridge vents, box roof vents, open valley flashing, chimney flashing, dormer flashing, and other flashing indicated.
  - 1. Form flashings to protect roofing materials from physical damage and shed water.
  - 2. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
  - 3. Hem exposed edges of flashings minimum 1/4 inch on underside.
  - 4. Metal Flashing: Use one of the following or equal:
    - a. Aluminum Sheet, ASTM B 209 (ASTM B 209M), 0.032 inch minimum thickness.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.
- B. Verify that deck is of sufficient thickness to accept fasteners.
- C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- D. Verify roof openings are correctly framed.
- E. Verify deck surfaces are dry, free of ridges, warps, or voids.

### **3.02 PREPARATION**

- A. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.
- B. Broom clean deck surfaces before installing underlayment or eave protection.
- C. Install eave edge flashings tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced as recommended in inches on center.

### **3.03 INSTALLATION - EAVE PROTECTION MEMBRANE**

- A. Install eave protection membrane from eave edge to minimum 4 ft up-slope beyond interior face of exterior wall.
- B. Install eave protection membrane in accordance with manufacturer's instructions.
- C. At vent pipes, install a 24 inch square piece of eave protection membrane lapping over roof deck underlayment; seal tightly to pipe.
- D. At vertical walls, install eave protection membrane extending at least 6 inches up the wall and 12 inches onto the roof surface, lapping over roof deck underlayment.
- E. At rake edges, install metal edge flashing over eave protection membrane and roof deck underlayment; set tight to rake boards; lap joints at least 2 inches and seal with plastic cement; secure with nails.

### **3.04 INSTALLATION - UNDERLAYMENT**

- A. Underlayment At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches. Stagger end laps of each consecutive layer. Nail in place. Weather lap minimum 4 inches over eave protection. See drawings for level and layers of final underlayment.
- B. Items projecting through or mounted on roof: Weather lap and seal watertight with plastic cement.

### **3.05 INSTALLATION - VALLEY PROTECTION**

- A. Install minimum 36 inches wide eave protection membrane up over first layer of protection, centered. Apply a 4 inch wide band of lap cement along each edge of first, press roll roofing into cement, and nail in place minimum 18 inches on center, 1 inch from edges.

### **3.06 INSTALLATION - METAL FLASHING AND ACCESSORIES**

- A. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.
- B. Secure in place with nails. Conceal fastenings.
- C. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

- D. Step Flashings:
  - 1. Step flashing shall be installed in all locations where roofing abuts a wall, chimney or other vertical roof penetration.
  - 2. Cut metal flashing pieces 7 inches by 10 inches and bend in half to form 7 inch by 5 inch sides.
  - 3. Fasten each flashing piece to the roof at the top edge with two roofing fasteners. Apply shingles on top of metal set in Bituminous Plastic Cement. Do not fasten flashing to wall.
  - 4. Install counterflashing and reglet over step flashing. Bottom of counterflashing shall be hemmed to form a 45 degree drip and shall be tight to the roof edge. Seal all edges of counterflashing watertight.

### **3.07 INSTALLATION - SHINGLES**

- A. Install shingles in accordance with manufacturer's instructions.
  - 1. Fasten individual shingles using 2 nails per shingle, or as required by code, whichever is greater.
  - 2. Fasten strip shingles using 4 nails per strip, or as required by code, whichever is greater.
  - 3. Avoid breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F.
  - 4. Handle carefully in hot weather to avoid damaging shingle edges.
- B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area. Provide double course of shingles at eaves.
- C. Project first course of shingles 3/4 inch beyond fascia boards.
- D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.
- E. Extend shingles on both slopes across valley in a weave pattern and fasten. Extend shingles a minimum of 12 inches beyond valley center line to achieve woven valley, concealing the valley protection.
  - 1. Run shingles from both roof slopes at least 12 inches across center of valley, lapping alternate sides in a woven pattern.
  - 2. Nail not closer than 6 inches to center of valley.
  - 3. Nail not closer than 6 inches to center of valley.
- F. Cap hips with individual shingles, maintaining 5 inch weather exposure. Place to avoid exposed nails.
- G. Make hips and ridges using shingles required by manufacturer.
- H. At ridges, install ridge shingles over ridge vent material; use nails of specified length; do not drive nails home, leaving 3/4 inch slot open between ridge and roof shingles.
- I. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.
- J. Complete installation to provide weather tight service.

### **3.08 PROTECTION**

- A. Do not permit traffic over finished roof surface.

**END OF SECTION**

**SECTION 07 46 19**  
**STEEL SIDING, ALUMINUM SOFFIT, AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Steel siding.
- B. Aluminum soffit.

**1.02 RELATED SECTIONS**

- A. Section 06 10 00 - Rough Carpentry: Framing and Sheathing.
- B. Section 07 46 23 – Engineered Wood Siding.
- C. Section 07 90 05 - Joint Sealers.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's standard printed product data and installation instructions for specified products.
- C. Selection Samples: Submit two sets of color chips of manufacturer's full range of colors for Architect 's selection.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to project site in original packaging.
- B. Store products in original packaging, on flat surface under cover, stacked no more than 12 boxes high.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's lifetime limited warranty.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Soffit and Trim Manufacturer: Alcoa Home Exteriors, Inc.; Omega Corporate Center, 1590 Omega Drive, Pittsburgh, PA 15205. ASD. Tel: (800) 962-6973. Email: alcoahomes@databanque.com. www.alcoahomes.com.
- B. Siding Plans and Specifications are based on Revere - Supergard Steel Siding, Double 5, Woodgrain Texture, color to be selected by Architect.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 ALUMINUM SOFFIT PANELS & FACIA**

- A. Aluminum Soffit: Traditional Series Soffit.
  - 1. Style: 12 inch (304.8 mm) wide panels, 3/8 inch (9.5 mm) deep, with double 5.5 inch (139.7 mm) wide faces forming V-grooves at 6 inches (152.4 mm) on center.
  - 2. Thickness: Nominal 0.016 inch (0.4 mm); aluminum alloy 3105-H28P.
    - a. Minimum Tensile Strength: 29,000 psi (2,038,903 g/sq cm).
    - b. Minimum Yield Strength: 25,000 psi (1,757,675 g/sq cm).
  - 3. Interlocking edges and elongated nailing hems.
  - 4. Finish: Alupalure 2000; two-phase operation including corrosion-inhibiting primer and baked-on high-performance acrylic topcoat.
  - 5. Color: As selected from manufacturer's full line.
  - 6. Supply ventilating type soffit material having perforations: 1/16 inch (1.58 mm) diameter holes on 5/32 inch (3.9 mm) staggered centers in a uniform 5 inch (127 mm) wide pattern along entire panel length.
    - a. Net Free Area: 15 square inches per linear foot (2.94 square m per linear m).

- B. Fascia shall be aluminum with woodgrain texture, color as selected. Bottom leg shall be returned to accept the soffit members.

### **2.03 ACCESSORIES**

- A. Accessories: Steel of same thickness, finish, and color as siding.
  - 1. Starter Strips.
  - 2. Outside Corner Posts.
  - 3. Inside Corner Posts.
  - 4. J-Channels.
  - 5. General Purpose Trim.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's printed installation instructions.
- B. Attach panels to substrate interlocked and lapped for weathertight installation, nails concealed; install horizontal components true to level and vertical components true to plumb.
  - 1. Space siding nails at 16 inches (406.4 mm) on center; center nails in nailing slots without binding to allow for thermal movement.
- C. Installation of joint sealers is specified in Section 07 90 05.

### **3.02 ADJUSTING AND CLEANING**

- A. Clean dirt from surface of installed products, using mild soap and water.
- B. After completing installation, remove from project site excess materials and debris resulting from installation.

**END OF SECTION**



**SECTION 07 46 23**  
**ENGINEERED WOOD SIDING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Lap, Board and Batten Siding panels with Diamond Kote Finish.
- B. Accessories and trim.

**1.02 RELATED SECTIONS**

- A. Section 06 10 00 - Rough Carpentry: Framing and Sheathing.
- B. Section 07 90 05 - Joint Sealers.

**1.03 REFERENCES**

- A. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2002.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods, including nailing patterns.
  - 4. Color chart for color selection by Architect.
- C. Maintenance and periodic inspection recommendations.

**1.05 QUALITY ASSURANCE**

- A. Installer: Provide installer with not less than three years of experience with products similar to those specified.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products off the ground, on a flat surface, and under a roof or separate waterproof covering.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

- A. Acceptable Manufacturer: LP SmartSide, which is located at: 414 Union St. Suite 2000; Nashville, TN 37219; Toll Free Tel: 888-820-0325; Fax: 877-523-7192; Email: request info (ben.barrette@lpcorp.com); Web:www.lpcorp.com/smartside
- B. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 SIDING**

- A. Basis of design for engineered siding is LP SmartSide.
- B. Treated Engineered Wood Panel Siding: LP SmartSide as manufactured by LP SmartSide.
  - 1. Description: Exterior-grade phenolic resin-saturated paper overlay laminated to EPA-registered zinc-borate-preservative-treated engineered wood siding; structurally rated; AWPA compliant; exposed edges sealed for moisture resistance; primed for painting.
- C. Factory Wood Finishing:
  - 1. Pre-finished composition siding manufacturers oven-cured water-based coating with metal oxide pigments.
  - 2. Basis of design: Subject to compliance with requirements, provide Diamond Kote Pre-Finish.

**2.03 ACCESSORIES**

- A. LP Trim: Planks, Select Rough Sawn Texture to Match, 7/16 inches thick, width as shown on drawings.

- B. Provide the following trim:
  - 1. Outside corners, butted to siding.
    - a. Finish: Factory finished based on Diamond Kote.
  - 2. Window and Door trim, butted to siding.
    - a. Finish: Factory finish based on Diamond Kote
- C. Sealant: Paintable, 100 percent acrylic latex sealant complying with ASTM C 920.
- D. Sheet Metal Flashing: Minimum 26 gage hot-dipped galvanized steel sheet, or aluminum.
- E. Nails: Length as required to penetrate minimum 1-1/4 inch into solid backing; hot-dipped galvanized or stainless steel, with heads finished to match siding.
- F. Finish Paint: Prefinished with Diamond Kote.

## **2.04 SIDING**

- A. Strand Panel Siding: Precision Series
  - 1. Description: Pre-finished strand siding material.
  - 2. Nominal Thickness: 3/8 inches or as shown on drawings.
  - 3. Nominal Board Width:
    - a. Lap Siding: 8-1/2" inches or as shown on drawings.
    - b. Board and Batten: 24" board with 2-1/2" battens or as shown on drawings.
  - 4. Board Length: 16 feet or as shown on drawings.
  - 5. Texture: Woodgrained.
  - 6. Color: Factory finish based on Diamond Kote, color to be selected by Architect.
- B. Siding Accessories:
  - 1. H-Moldings: Pre-finished composition siding manufacturer's standard aluminum moldings designed to cover gaps between siding panel butt joints.
    - a. Color: Match siding.
    - b. Length: and exposure length matching siding.

## **2.05 TRIM**

- A. Inside Corner Nail Fin Trim: Pre-finished strand siding material manufactured with integral plastic nailing fin.
  - 1. Thickness: 0.91 inches.
  - 2. Exposure: 1-3/4 inches each leg.
  - 3. Length: 10 feet.
  - 4. Texture: Woodgrained.
  - 5. Color: Factory finish based on Diamond Kote
- B. Outside Corner Nail Fin Trim: Pre-finished strand siding material manufactured with integral plastic nailing fin.
  - 1. Thickness: 0.91 inches.
  - 2. Exposure: 3-1/2 inches each leg.
  - 3. Length: 10 feet 16 feet.
  - 4. Texture: Woodgrained.
  - 5. Color: Factory finish based on Diamond Kote
- C. Strand Trim: Solid pre-finished trim members; same material as cladding.
  - 1. Thickness: 0.625 inch 0.91 inch.
  - 2. Width: 3-1/2 inch, 5-1/2 inch, 7.2, 8 inch or as shown on drawings.
  - 3. Length: 16 feet.
  - 4. Texture: Woodgrained.
  - 5. Color: Factory finish based on Diamond Kote

## **2.06 ACCESSORIES**

- A. Fasteners: ASTM A153, hot-dip galvanized or stainless steel nails; size recommended by manufacturer to achieve proper penetration of substrate.

1. Colored Fasteners: Pre-finished nails, color to match siding.
- B. Flashing: Minimum 0.019 inch (0.48 mm) thick prefinished aluminum.
  1. Flashing Types:
    - a. Drip Cap Flashing: Preformed z-shaped flashing for use above horizontal trims.
    - b. Diverter Flashing: Preformed flashing used where sloped roofs meet vertical walls.
    - c. Spacer Flashing: Preformed flashing provides clearance gaps between siding materials and roofing, decks and hardscape materials.
    - d. Brick Ledge Flashing: Preformed flashing for use between masonry and composition siding.
    - e. Z-Flashing: Preformed flashing designed to keep water out of horizontal seams when stacking panel siding.
    - f. Trim Coil: 24 inch wide prefinished aluminum sheet stock for field forming, 50 feet long.
  2. Aluminum Flashing Finish: As provided by siding manufacturer.
    - a. Color: As selected by Architect from manufacturer's full range
- C. Starter Boards: Pre-finished composition siding manufacturer's standard PVC-based trim with integral concealed fastener installation system in colors to match siding.
  1. Nominal Thickness: 3/4 inch or as shown on drawings.
  2. Height: 8-1/2" inches or as shown on drawings.
  3. Exposure: 5-13/16 inches or as shown on drawings.
  4. Length: 16 feet or as shown on drawings.
- D. Sealant: ASTM C920, minimum Class 25 sealant, type recommended by siding manufacturer.
- E. Touch-Up Paint: Pre-finished composition siding manufacturer's standard touch-up paint provided in 8 ounce bottles in colors matching siding.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Prior to commencing installation, verify governing dimensions of building and condition of substrate.

### **3.02 PREPARATION**

- A. Examine, clean, and repair as necessary any substrate conditions that would be detrimental to proper installation.
- B. Do not begin installation until unacceptable conditions have been corrected.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and drawing details.
  1. Read warranty and comply with all terms necessary to maintain warranty coverage.
  2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
  3. Use trim details indicated on drawings.
  4. Touch up all field cut edges before installing.
  5. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- C. Allow space between both ends of siding panels that butt against trim for thermal movement; seal joint between panel and trim with exterior grade sealant.
- D. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- E. Install sheet metal flashing above door and window casings and horizontal trim in field of siding.
- F. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.

- G. After installation, seal all joints except vertical butt joints of siding. Seal around all penetrations. Paint all exposed cut edges.
- H. Siding:
  - 1. Start panel installation at the middle of a stud.
  - 2. Keep nails 2 inches away from corners and 3/8 inch from panel edges.
  - 3. Start at edge of panel and work across panel.
  - 4. Allow a 1/8 inch gap between panels.
  - 5. Cover joints with battens as shown on drawings. Install decorative battens as shown on drawings. Battens shall be cut from the same material as the siding.
- I. Finish Painting: Siding shall be finished with Diamond Kote; standard colors.

#### **3.04 CLEANING**

- A. At completion of work, remove debris caused by siding installation from project site.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

**SECTION 07 62 00  
SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including coping, flashings, counterflashings, gutters and downspouts.
- B. Sealants for joints within sheet metal fabrications.
- C. Reglets and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Wood Blocking and Curbing: Wood blocking for roof coping substrate profiles.
- B. Section 07 31 13: Roofing system.
- C. Section 07 90 05 - Joint Sealers.

**1.03 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- B. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit samples illustrating metal finish color for selection by Architect.

**1.06 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

**1.07 PRE-INSTALLATION CONFERENCE**

- A. Convene one week before starting work of this section.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

**PART 2 PRODUCTS**

**2.01 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum inch thick base metal, shop pre-coated with Kynar 500 coating, color as selected.

- B. Coping and other metals exposed to view shall be 24 gauge hot dipped galvanized steel, G-90 commercial quality, extra smooth primed and finished one side with 70% Kynar 500 Based Fluoropolymer Coating 1.0 +/- 0.1 mil total dryfilm thickness. A wash coat of .3 - .4 mil dryfilm thickness shall be applied to the reverse side. Metal sheet stock shall be as manufactured by one of the following or approved equal:
  - 1. Berridge Manufacturing Company - Coil Stock
  - 2. Peterson Aluminum Corp. PAC- CLAD;
  - 3. Metal Sales Manufacturing Corp. - Coil Stock
  - 4. Vincent Metals - Colorklad
  - 5. AEP Span - Sheet Stock
  - 6. Copper Sales, Inc. - UNA-CLAD
  - 7. McElroy Metal, Inc. - Flat Stock

## **2.02 ACCESSORIES**

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Sealant to be concealed in Completed Work: Non-curing butyl sealant.
- D. Sealant to be Exposed in Completed Work: 1; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- E. Sealant: Type specified in Section 07 90 05.
- F. Plastic Cement: ASTM D4586, Type I.
- G. Reglets: Surface mounted type, of Kynar colored metal.
- H. Solder: 1; Sn50 (50/50) type.
- I. Ice and Water Shield.

## **2.03 GUTTERS AND DOWNSPOUTS**

- A. Gutters: SMACNA (ASMM), Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- D. Accessories: Profiled to suit gutters and downspouts.
- E. Anchorage Devices: In accordance with SMACNA requirements.
- F. Gutter Supports: Brackets.
- G. Downspout Supports: Brackets.
- H. Furnish screen type covers over gutters.
- I. Splash Blocks: Suitable and compatible for gutter/downspout application; pre-cast.
- J. Seal metal joints.
- K. Color selected by Architect from manufacturer's standard colors.

## **2.04 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, interlocking with sheet.
- C. Form pieces in longest possible lengths, but not exceeding 10 feet.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

- H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.
- I. Fabricate copings to the size and shape as shown on drawings. No individual section of coping shall exceed ten feet in length. Copings shall be continuously held at their bottom edge with a keeper strip
- J. Joints in coping shall be covered with a 6 inch wide cleat bent to the profile of the coping.
- K. Metal counterflashing shall be the type of flashing locked into the mortar joint by springlock action and tight to the wall at the bottom edge with Spring Action Contact fabricated to the size and configuration shown on drawings.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

#### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

#### **3.03 INSTALLATION**

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Seal metal joints watertight.
- E. Install sheet metal coping and other metal exposed to view as shown on drawings using recognized sheet metal practices as per the Sheet Metal and Air Conditioning Contractors National Association, Inc. - Architectural Sheet Metal Manual.
- F. Bottom edge of all coping shall be held in place with a continuous keeper strip.
- G. Joints in coping shall be set in mastic and butted to allow for expansion. Joint shall be covered with a 6" wide cleat.
- H. Joints in brick flashing shall be lapped a minimum of 3".
- I. After metal coping, or flashing is in place, remove strippable film protection.

**END OF SECTION**





**SECTION 07 84 00  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.
- B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- D. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration.
- C. Product Data: Provide data on product characteristics.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Certificate from authority having jurisdiction indicating approval of materials used.

**1.04 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
  - 2. Current evaluation reports published by CABO, ICBO, or BOCA will be considered as constituting an acceptable test report.
  - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. With minimum 3 years documented experience installing work of this type.

**1.05 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

**PART 2 PRODUCTS**

**2.01 FIRESTOPPING - GENERAL REQUIREMENTS**

- A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

**2.02 FIRESTOPPING SYSTEMS**

- A. Firestopping: Any material meeting requirements.
  - 1. Fire Ratings: Use any system listed by UL or that has F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and that meets all other specified requirements.

- B. Manufacturer's:
  - 1. Fire stopping and fire safing products shall be UL or Warnock Hersey Rated Systems as manufactured by one of the following or approved equal:
    - a. Rectorseal Corporation, Metacaulk
    - b. Isolatek International, Cafco
    - c. 3M
    - d. The General Electric Company
    - e. Nelson Firestop Products
    - f. Hilti Construction Chemicals
    - g. Tremco Construction Division
    - h. United States Gypsum Company

### **2.03 MATERIALS**

- A. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
- B. Foam Firestopping: Single component foam compound.
- C. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers.
- D. Fiber Packing Material: Mineral fiber packing insulation.
- E. Firestop Devices: Mechanical device with incombustible filler and sheet stainless steel jacket;
- F. Intumescent Putty: Compound which expands on exposure to surface heat gain.
- G. Firestop Pillows: Formed mineral fiber pillows
- H. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.
- C. Install labeling required by code.

### **3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

### **3.05 PROTECTION**

- A. Clean adjacent surfaces of firestopping materials.
- B. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

**SECTION 07 90 05**  
**JOINT SEALERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sealants and joint backing.

**1.02 REFERENCE STANDARDS**

- A. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- B. ASTM D1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005 (Reapproved 2011).

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.
- C. Samples: Submit two samples, in size illustrating sealant colors for selection.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

**1.05 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

**PART 2 PRODUCTS**

**2.01 SEALANTS**

- A. Non-sag Urethane - Caulking compound shall be one-part polyurethane caulking compound, that meets or exceeds the requirements of Fed. Spec. TT-S-00230C. Compound shall be as recommended by the manufacturer for use without a paint finish and shall form a tough elastic film on the surface, but remain plastic underneath. It shall contain no ingredients which will stain masonry or corrode metals. Color of compound shall be as selected by the Architect. At the contractor's option he may use two-part caulking compound of the same materials as those specified herein. Caulking compound shall be one of the following or approved equal:
  - 1. Mameco International - Vulkem 116 or 227
  - 2. Sika Chemical Co. - Sika-Flex 1a or 2c NS
  - 3. Sonneborne - Sonolastic NP1 or NP2
  - 4. Tremco - Dymonic or Dymeric
  - 5. Pecora - Dynatrol I or Dynatrol II
  - 6. PRC - Permapol RC1 or Permapol RC2
  - 7. Bostick - Chem-Calk 500
  - 8. May National Associates - Bondaflex PUR 25
- B. Interior Silicone - Silicone sealant for joints along backsplash on counters, shelves, cabinets and plumbing fixtures shall be one of the following or approved equal:
  - 1. General Electric - Sanitary 1700
  - 2. Dow Corning - 786 Mildew resistant

3. May National Associates - Sil 100 WF
- C. Self-Leveling Horizontal Urethane - Self Leveling caulking compound shall be self-leveling or slope grade Two-component Polyurethane Sealant for expansion and contraction joints in concrete floors, walks, paving and decks both interior and exterior, and joints in hard surface floor finish materials such as quarry tile, ceramic tile and terrazzo. Horizontal grade urethane shall remain flexible to -400, shall be abrasion resistant and resist deterioration caused by weather, stress, movement, traffic, water, oils, and road chemicals. Self-Leveling caulking shall be suitable for continuous water immersion. Self-Leveling Caulking shall be as manufactured by one of the following or approved equal:
  1. Sonneborn - SL 2 Sealant
  2. Pecora - Urexpan NR-300
  3. Tremco - THC-900/901
  4. Sika Chemical Co. - Sikaflex 2c SL
  5. Mameco International - Vulkem 245
  6. PRC - Permapol RC-2SL
  7. Bostick - Chem-Calk 550
  8. May National Associates - Bondaflex PUR 2 NS & SL

## **2.02 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width. Sub-caulking shall be one of the following or approved equal:
  1. Dow Chemical - Etha-Foam.
  2. Williams Products - Expand-O Foam.
  3. Grace Co. - Foam Joint Filler.
  4. Sonneborn - Sonofoam Closed Cell Backer Rod.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.
- H. Pre-compressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

### **3.05 PROTECTION**

- A. Protect sealants until cured.

### **3.06 SCHEDULE**

- A. Caulking and sealants specified under this Section shall be installed at the intersection of all dissimilar materials not mechanically or adhesively attached to each other, at the expansion and contraction joints of similar or dissimilar materials, and where it is necessary to provide a smooth transition between materials of differing shapes. The following list of areas to be caulked or sealed is intended as a general guide to this Contractor and does not relieve the contractor of providing caulking to all areas shown on the drawings and that fit the above definition:
  - 1. Non-sag Urethane:
    - a. Gypsum Drywall Control Joints as shown on drawings.
    - b. Around the frames of Doors, Windows & Louvers - each exposed side.
    - c. Vertical concrete, and masonry control and expansion joints.
    - d. Under door thresholds - at the inside and outside edge of the threshold.
    - e. Flashing reglet terminations.
    - f. Where gypsum drywall intersects concrete, masonry, wood or other dissimilar material.
    - g. Where exterior window sills intersect walls and window frames.
    - h. Joints in vertical ceramic tile and other hard surface materials.
    - i. All other Joints noted on Drawings as "Caulk" or "Sealant".
    - j. All joints which meet the definition of paragraph "A" above.
  - 2. Interior Silicone:
    - a. Along Backsplash of Counters & Edges of Casework at Walls.
    - b. Along the Edges of Plumbing Fixtures at Walls
    - c. Along the edges, or as seating for Toilet Accessories.
    - d. As a seating for sinks and other items mounted into countertops.
  - 3. Self-Leveling Horizontal Urethane:
    - a. Horizontal and sloped expansion joints in floors and decks.
    - b. Horizontal and sloped expansion and control joints in interior hard surface flooring materials.

**END OF SECTION**



## SECTION 08 11 13

### HOLLOW METAL DOORS AND FRAMES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Fire rated hollow metal doors and frames.
- C. Hollow metal frames for wood doors.
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.

##### 1.02 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.
- C. Section 09 90 00 - Painting and Coatings: Field painting.

##### 1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2017.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- G. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- H. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- I. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- J. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- K. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

##### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- C. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

##### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door Products: [www.cecodoor.com](http://www.cecodoor.com).
  - 2. Republic Doors: [www.republicdoor.com](http://www.republicdoor.com).
  - 3. Steelcraft: [www.steelcraft.com](http://www.steelcraft.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 DESIGN CRITERIA**

- A. Requirements for All Doors and Frames:
  - 1.
  - 2. Door Top Closures: Flush with top of faces and edges.
  - 3. Door Texture: Smooth faces.
  - 4. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
  - 5. Galvanizing for Units in Wet Areas: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness
  - 6. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 HOLLOW METAL DOORS**

- A. Exterior Doors: Thermally insulated.
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
  - 2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  - 3. Door Thickness: 1-3/4 inch, nominal.
  - 4. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
  - 5. Weatherstripping: Refer to Section 08 71 00.
- B. Interior Doors, Non-Fire Rated:
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
  - 2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  - 3. Door Thickness: 1-3/4 inch, nominal.



- C. Interior Doors, Fire-Rated:
  - 1. Grade: ANSI/SDI A250.8 (SDI-100); Level 1 - Standard-Duty, Physical Performance Level C, Model 1 - Full Flush.
  - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
    - a. Provide units listed and labeled by UL (Underwriters Laboratories) - UL (BMD).
    - b. Attach fire rating label to each fire rated unit.
  - 3. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch w.g. pressure at both ambient and elevated temperatures; with "S" label; if necessary, provide additional gasketing or edge sealing.

#### **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
  - 1. Comply with the requirements of grade specified for corresponding door.
    - a. ANSI A250.8 Level 2 Doors: 16 gage frames.
    - b. ANSI/SDI A250.8 (SDI-100), Level 2 and 3 Door Frames: 14 gage, 0.067 inch, minimum thickness.
    - c. Frames for Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 1, 18 gage, 0.042 inch, minimum thickness.
  - 2. Finish: Same as for door.
  - 3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
  - 4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
  - 5. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.
- C. Exterior Door Frames: Full profile/continuously welded type.
  - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  - 2. Weatherstripping: Separate, see Section 08 71 00.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
- E. Interior Door Frames, Fire-Rated: Face welded type.
  - 1. Fire Rating: Same as door, labeled.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- C. Interior Door Frames, Non-Fire-Rated: Knockdown type. See drawings for sizes, etc.
  - 1. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
  - 2. Frame Metal Thickness: 18 gage, 0.042 inch, minimum.
  - 3. See drawings for frames with side-lites.
  - 4. Manufacturer: Redi-frame or approved equal.
- D. Interior Door Frames, Fire-Rated: Knockdown type. See drawings for sizes, etc.
  - 1. Fire Rating: Same as door, labeled.
  - 2. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch, maximum, above floor at 45 degree angle.
  - 3. Frame Metal Thickness: 18 gage, 0.042 inch, minimum.
  - 4. Manufacturer: Redi-frame or approved equal.

#### **2.05 ACCESSORIES**

- A. Glazing: As specified in Section 08 80 00, factory installed.
- B. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

- C. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **2.06 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Coordinate installation of hardware.
- F. Coordinate installation of glazing.

### **3.04 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

### **3.05 SCHEDULE**

- A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**

**SECTION 08 14 16  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Doors; flush and flush glazed configuration; fire rated, non-rated, standard and special function.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014 with Errata (2018).
- B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; National Fire Protection Association; 2019.
- D. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- E. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- F. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2013. (ANSI/WDMA I.S. 1A)

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Specimen warranty.
- E. Samples: Submit two samples of door veneer, illustrating wood grain, stain color, and sheen.
- F. Warranty, executed in Owner's name.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with AWS Architectural Woodwork Standards, Section 9, Custom Grade.
- B. Finish doors in accordance with AWS Architectural Woodwork Standards, Section 5.

**1.06 REGULATORY REQUIREMENTS**

- A. Fire Door Construction: Conform to NFPA 252.
- B. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire-rating as indicated.
- C. Smoke and Draft Control Doors: In addition to required fire rating, comply with air leakage requirements of UBC Std 7-2, Part II; with "S" label; if necessary, provide additional gasketing or edge sealing.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.

- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

#### **1.08 PROJECT CONDITIONS**

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

#### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Provide warranty for the following term:
  - 1. Interior Doors: Life of installation.
- D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors: Basis of Design – VT Industries.
- B. Veneer Doors, 5 Ply:
  - 1. Marshfield Door Systems, Inc.
  - 2. Construction Specialties Inc.
  - 3. VT Industries
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 DOORS**

- A. Doors: See drawings for locations and additional requirements.
  - 1. Quality Level: Custom Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at each location.
  - 2. Fire Rated Doors: Tested to 20 minutes, 60 minutes, 90 minutes, and ratings as indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc. (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  - 3. Smoke and Draft Control Doors: Tested to ratings indicated on drawings in accordance with International Building Code; UL labeled if required by applicable code; provide gasketing as specified by listing.
  - 4. Wood veneer facing, factory finished.

#### **2.03 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

#### **2.04 DOOR SCHEDULE**

- A. Veneer Facing: Grade in accordance with quality standard indicated, with book match, running match leaves assembled on door or panel face.
  - 1. Species: Plain sliced red oak, factory finished to match existing facility doors.
- B. Wood Doors: VT Industries; Design intent is to match that of existing conditions.

#### **2.05 ACCESSORIES**

- A. Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

## **2.06 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. Fabricate fire rated doors in accordance with UL requirements. Attach fire rating label to door.
- D. Provide solid blocks at lock edge for hardware reinforcement.
  - 1. Provide solid blocking for other through bolted hardware.
- E. Vertical Exposed Edge of Stiles - Veneer Faces: Of same species as veneer facing.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.

## **2.07 FACTORY FINISHING - WOOD VENEER DOORS**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.
    - b. Stain: As selected by Architect.
    - c. Sheen: Satin.
- B. Seal door top edge with color sealer to match door facing.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).
  - 1. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- D. Use machine tools to cut or drill for hardware.
- E. Coordinate installation of doors with installation of frames and hardware.
- F. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**END OF SECTION**



**SECTION 08 31 00**  
**ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall access door and frame units.
- B. Ceiling access door and frame units.
- C. Floor access door and frame units, interior.
- D. Access door and frame units, non-fire-rated, in wall and ceiling locations.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 20 00 - Unit Masonry: Openings in masonry.
- B. Section 09 21 16 - Gypsum Board Assemblies: Openings in ceilings.
- C. Section 09 90 00 - Painting and Coating: Field paint finish.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of all access door units.

**PART 2 PRODUCTS**

**2.01 ACCESS DOOR AND PANEL APPLICATIONS**

- A. Floor Access Doors, Interior:
  - 1. Size: 36 by 36 inches (915 by 915 mm).

**2.02 MANUFACTURERS**

- A. Wall and Ceiling Access Doors:
  - 1. Acudor Products Inc: Model DW-5040 for gypsum board ceilings; Model AT-5020 for masonry wall applications with Recess for tile. [www.acudor.com](http://www.acudor.com).
  - 2. Karp Associates, Inc: Model KDW for gypsum board ceilings; Model DSC-210 for masonry wall applications with Recess for tile. [www.karpinc.com](http://www.karpinc.com).
  - 3. J.L. Industries, 4450 W. 78th St. Circle, Bloomington, MN 55435 (612) 835-6850, - Model WB for gypsum board ceilings; Model CT for masonry wall applications with Recess for tile.
  - 4. Nystrom, Inc., 1701 N.E. Madison Street, Minneapolis, MN 55413, (612) 781-3491, - Model NW for gypsum board ceilings; Model RA for masonry wall applications with Recess for tile.
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 ACCESS DOORS AND PANELS**

- A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

**2.04 WALL AND CEILING UNITS**

- A. Access Doors: Factory fabricated door and frame units, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.
  - 1. Material: Steel.
  - 2. Door Style: Single thickness with rolled or turned in edges.

## **2.05 ACCESS DOOR UNITS - WALLS & CEILINGS AND CEILINGS**

### **2.06 FLOOR UNITS**

- A. Recessed floor access hatches shall be Howe Green Ltd HSE 75 series, with a 3 hour fire rating to BS 476: Part 20: 1987, aluminum show edges, hatch to be fitted with concealed multi-link hinges, gas springs, steel base plate, reinforcement and double seal, top and underside release. Sizes shall be as shown on contract drawings. Covers are to be supplied with 3 sets of combined lifting/securing keys. All to be manufactured and supplied by Howe Green Ltd., 5601 Division Drive, Fort Myers, FL 33905, telephone:239-689-5334 and installed in accordance with the manufacturer's installation details and site work guide.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings. Secure rigidly in place.
- C. Position units to provide convenient access to the concealed work requiring access.

**END OF SECTION**



**SECTION 08 43 13**  
**ALUMINUM-FRAMED STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Perimeter sealant.
- E. Some storefront will be salvaged for re-installation.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
- C. Section 08 80 00 - Glazing: Glass and glazing accessories.

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

**1.05 PERFORMANCE REQUIREMENTS**

- A. Design and size components to withstand the following load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
  - 1. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E 283.
- D. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 2.86 lbf/sq ft.
- E. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- F. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
- G. Glazing is required to have U-factor of .29 or better and a SHGC of .4 or better, in addition, the glass entry doors need a u factor of .77 to meet MN Energy Codes compliance.

**1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- E. Submit manufacturers standard samples indicating quality of finish. Where normal texture or color variations are expected, include additional samples illustrating range of variation. Submit samples for each glass type, 12 x 12 inch size.

#### **1.07 QUALITY ASSURANCE**

- A. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. To ensure quality of appearance and performance, obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.

#### **1.08 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

#### **1.10 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

#### **1.11 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturers: Basis of design; Kawneer.
  1. United States Aluminum Corp.
  2. Oldcastle Building Envelope.
  3. Tubelite.
  4. YKK AP.
  5. Kawneer North America
- B. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 STOREFRONT**

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  1. Glazing Position: Centered (front to back).
  2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
  3. Finish: Red to match existing.
  4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.

5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
  7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
  8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
  9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. COMPONENTS**
1. Aluminum Framing Members: Tubular aluminum sections, double thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
    - a. Framing members for interior applications need not be thermally broken.
    - b. Glazing Stops: Flush.
    - c. Cross-Section: 2 x 4-1/2 inch nominal dimension.
- C. MATERIALS**
1. Extruded Aluminum: ASTM B221 (ASTM B221M).
  2. Fasteners: Stainless steel.
  3. Perimeter Sealant: Type as specified in Section 07 90 05.
  4. Glass: As specified in Section 08 80 00.
  5. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- D. FINISHES**
1. Red to match existing.
- E. FABRICATION**
1. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
  2. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
  3. Prepare components to receive anchor devices. Fabricate anchors.
  4. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
  5. Arrange fasteners and attachments to conceal from view.
  6. Reinforce components internally for door hardware and door operators.
  7. Reinforce framing members for imposed loads.
  8. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
    - a. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in caulking bead each edge and secure. Caulking as specified in Section 07 90 05.
- J. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
- K. Install perimeter sealant in accordance with Section 07 90 05.
- L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

### **3.04 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.

### **3.05 PROTECTION**

- A. Protect installed products from damage during subsequent construction.
- B. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
- C. Protect finished work from damage.

**END OF SECTION**

**SECTION 08 52 13**  
**ALUMINUM/WOOD COMPOSITE WINDOWS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum /wood composite windows.
- B. Panning and trim as required.
- C. Glass & glazing.
- D. Perimeter Sealants.

**1.02 RELATED SECTIONS**

- A. Section 06 10 00 - Rough Carpentry: Stud wall installation.
- B. Section 07 90 05 - Joint Sealers: Perimeter sealant.

**1.03 REFERENCES**

- A. AAMA 101-93: Voluntary Specifications for Aluminum Prime Windows & Sliding Glass Doors.
- B. AAMA 605.2-92: Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
- C. AAMA 502-90: "Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
- D. ANSI/ASTM A386: Zinc-coating (Hot Dip) on Assembled Steel Products.
- E. ANSI/ASTM B221: Aluminum Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- F. ANSI/ASTM E283-91: Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.
- G. ANSI/ASTM E330-86: Structural Performance of Exterior Windows, Curtain Walls and Doors.
- H. ASTM E331-86: Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- I. ASTM E547: Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference.
- J. ASTM B209: Aluminum and Aluminum Alloy steel and plate.
- K. FS TT-P-31: Paint, Oil: Iron-oxide, Ready Mixed, Red and Brown.
- L. FS TT-P-641: Primer Coating: Zinc Dust-Zinc Oxide (For Galvanized Surfaces).

**1.04 PERFORMANCE REQUIREMENTS**

- A. General: Provide aluminum/wood composite window units that meet or exceed performance requirement specified:
  - 1. Subsection 4.3 of ANSI/NWWDA I.S. 2-93: Grade DP-60.
  - 2. ANSI/AAMA 101-93 Section 2.2.5 Projected Windows. Architectural Window Class 55.
- B. Design Requirements: Comply with the structural performance, air infiltration, and water penetration indicated in AAMA 101 for type, grade and performance class of window units required.
- C. Testing: Test each type and size of required window unit through a recognized independent testing laboratory or agency, in accordance with ASTM E331 for water penetration.
  - 1. Air Infiltration: Exterior windows will not exceed 0.10 CFM per lineal foot of sash crack when tested in accordance with ASTM E283-91 at a uniform pressure of 6.24 PSF.
  - 2. Water Resistance: No water leakage will occur when windows are tested in accordance with ASTM E331-86 at static pressure of 10.00 PSF.
- D. Window Components to provide for expansion and contraction caused by cycling temperature range of 170 F degrees without causing detrimental effects on components.
- E. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within the system, to exterior.

### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's literature and installation instructions.
- C. Shop Drawings: Indicate wall opening tolerances required, anchorage and fasteners, affected related work, air and vapor barrier seal to adjacent construction, installation requirements, and internal reinforcing.
- D. Color samples for selection by Architect.
- E. Test Reports: Indicate certification by a recognized independent testing laboratory or agency showing that each type, grade and size of window unit complies with performance requirements for air infiltration, uniform load and water resistance.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

### **1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section and approved by manufacturer.

### **1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Deliver window units to project site in protective wrapping.
- B. Store window units under cover and elevated above grade.

### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Submit a written warranty, executed by the window manufacturer, agreeing to repair or replace window units that fail in materials or workmanship within the specified period. Failures include but are not necessarily limited to:
  - 1. Structural failures including excessive deflection, excessive leakage or air infiltration.
  - 2. Faulty operation of sash and hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal wear.
- C. Glass: 10 years from the date of manufacture on the insulated glass spacers. Insulating glass shall be warranted against obstruction of vision between interior glass surfaces.
- D. Hardware: 10 years on hinges and handle assembly.
- E. Exterior Finish: 10 years from the date of substantial completion.
- F. Materials and Workmanship: 10 years from the date of substantial completion.
- G. Warranty to cover complete window system for failure to meet specified requirements. Warranty to also include locks, balances, materials supplied by others and necessary labor.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Plans and specifications are based on windows manufactured by Marvin Windows.
  - 1. Finish to be chosen by Architect from standard line of options. Design intent is to match that of existing conditions.
- B. Substitutions: Permitted.

### **2.02 MATERIALS**

- A. Extruded Aluminum: Exterior, tempered aluminum frame, sash and glazing stop. Minimum wall thickness to be 0.059 inches.
- B. Interior Wood: Clear Ponderosa Pine, free of finger joints, or veneer wrapped over finger jointed clear cut Ponderosa Pine, kiln dried to a moisture content of 6 -12 percent and preservative treated. Wood frame sash will be a minimum of 1-1/4 inch thick.

- C. Insulating Glass: CBA rated clear insulating glass 7/8 inch thick; 5/32 clear tempered glass interior and exterior Low E film on surface #2, argon filled with warm edge insulating air spacer.
- D. Weatherstripping: Full perimeter Schlegel Q-Lon weather gasket. Double weatherstrip above and below operator at sill.
- E. Sealant: as specified in Section 07 90 05.
- F. Wall Flashing: Rubberized asphalt laminated to a polyethylene film. Flashing membrane shall be self-adhering. Flashing shall be as manufactured by one of the following or approved equal:
  1. Carlisle: Window and Door Flashing.
  2. Mirafi: 400VB.
  3. WR Meadows: Air-Shield.

### **2.03 FABRICATED COMPONENTS**

- A. Window Type: window unit configurations as indicated on the drawings.
- B. Accessories: Positioning Fin, attach vinyl positioning fin with pre-punched installation holes.
- C. Bug Screens; manufacturers standard.

### **2.04 FABRICATION**

- A. Fabricate windows and sill flashing allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit and secure aluminum joints and 45 degree mitered corners at standard glazed units. Accurately fit and secure corners tight. Make corner joints flush, hairline and weatherproof. Seal corner joints with silicone sealant.
- C. Wood corner joinery to be mortised and tenoned joints, glued, stapled and caulked.
- D. Fabricate window units with a continuous butyl tape gasket thermal/moisture barrier, located between exterior aluminum and interior wood. Aluminum is nailed to wood with stainless steel ring-shanked nails on 6 inch spacing around perimeter of frame and sash.
- E. Weep Holes: Two weep holes shall be processed into each sill to allow water drainage to exterior.
- F. Wood Surfaces shall be smooth and free of surface defects.
- G. Insulated Glass shall be factory installed.

### **2.05 FACTORY FINISHING**

- A. Exterior Aluminum Surfaces: Coating to be Powder Coat finish which meets or exceeds AAMA 605.2-92, color to match existing windows.
- B. Interior Wood: Windows shall be factory pre-finished utilizing a catalyzed lacquer sprayed finish prior to window assembly. Finish to match finish on existing windows.
- C. Concealed Steel Items: Galvanized in accordance with ANSI/ASTM A386 to 2.0 oz/sf or primed with iron oxide paint.
- D. Apply one coat of bituminous paint to conceal aluminum and steel surfaces in contact with cementitious or dissimilar materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that wall openings and adjoining air and vapor seal materials are clean, dry and ready to receive work of this Section.
- B. Verify that rough opening is correct and sill plate is level.
- C. Beginning of installation means acceptance of existing conditions.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely attach frame to structure.

- C. Align window frame plumb and level, free of warps or twist. Maintain dimensional tolerances, aligning with adjacent work.
- D. Coordinate attachment and seal of air and vapor barrier materials. Install under sill and sill break metal flashing.
- E. Install wall flashing at doors, windows and other openings in the exterior wall. Flashing shall be firmly pressed into place over the nailing flanges and other anchoring devices used.
  - 1. Install flashing in a shingle fashion starting at the bottom of openings (except doors at grade level).
  - 2. Extend flashing at the bottom of the opening the full width of the opening plus the width of the flashing on each side of the opening.
  - 3. Next install flashing at the sides of the opening, covering the extension of the bottom flashing completely and extending the flashing beyond the top of the opening a minimum of 1 inch.
  - 4. Install the top flashing tight to the top of the wall opening and so as to cover the ends of the side flashing and extend out beyond the side flashing.
- F. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier.
- G. Install perimeter sealant and backing materials as per Section 07 90 05.
- H. Adjust operable hardware for smooth operation and tight fit.

### **3.03 CLEANING AND PROTECTION**

- A. Remove protective material from prefinished aluminum surfaces.
- B. Clean exposed surfaces using a solution of mild detergent in warm water, applied with soft clean wiping cloths. Take care to remove dirt from corners. Remove dirt and window label. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- D. Protect installed windows from subsequent construction operations.

**END OF SECTION**



**SECTION 08 71 00  
DOOR HARDWARE**

**PART 1 - GENERAL**

**1.1 CONDITIONS**

- A. Conditions of the contract (General and Supplementary Conditions) and Division 01 - General Requirements, govern the work of this section.
- B. This section includes all material, and related service necessary to furnish all finish hardware indicated on the drawings or specified herein.
- C. Furnish UL listed hardware for all labeled and 20 min. openings in conformance with the requirements for the class of opening scheduled. Underwriters' requirements shall have precedence over specification where conflicts exist.
- D. All work shall be in accordance with all applicable state and local building codes. Code requirements shall have precedence over this specification where conflicts exist.

**1.2 WORK INCLUDED**

- A. This section includes the following:
  - 1. Furnish door hardware (for hollow metal, wood and aluminum doors) specified herein, listed in the hardware schedule, and/or required by the drawings.
  - 2. Cylinders for Aluminum Doors
  - 3. Thresholds and Weather-stripping (Aluminum frame seals to be provided by aluminum door supplier)
  - 4. Electro-Mechanical Devices
  - 5. Access Control components and or systems specified within this section.
- B. Where items of hardware are not definitely or correctly specified and is required for the intended service, such omission, error or other discrepancy should be directed to the Architect prior to the bid date for clarification by addendum. Otherwise furnish such items in the type and quantity established by this specification for the appropriate service intended.

**1.3 RELATED WORK IN OTHER SECTIONS**

- A. This section includes coordination with related work in the following sections:
  - 1. Division 06 Section "Finish Carpentry".
  - 2. Division 06 Section "Cabinet Hardware"
  - 3. Division 08 Section "Hollow Metal Doors and Frames".
  - 4. Division 08 Section "Wood Doors"
  - 5. Division 08 Section "Aluminum Entrances and Storefronts"
  - 6. Division 26 Sections "Electrical"
  - 7. Division 28 Sections "Electronic Safety and Security".

**1.4 REFERENCES**

- A. Publications of agencies and organizations listed below form a part of this specification section to the extent referenced.
  - 1. DHI - Recommended Locations for Builders' Hardware.
  - 2. NFPA 80 - Standards for Fire Doors and Windows.
  - 3. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
  - 4. UL - Building Material Directory.
  - 5. DHI - Door and Hardware Institute
  - 6. WHI - Warnock Hersey
  - 7. BHMA - Builders Hardware Manufacturers Association
  - 8. ANSI - American National Standards Institute
  - 9. IBC 2018 - International Building Code 2018 Edition (as amended by local building code)

**1.5 SUBMITTALS**

- A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 01 - General Requirements.
- B. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:
  - 1. Door number, location, size, handing, and rating.
  - 2. Door and frame material, handing.
  - 3. Degree of swing.
  - 4. Manufacturer
  - 5. Product name and catalog number
  - 6. Function, type and style
  - 7. Size and finish of each item
  - 8. Mounting heights
  - 9. Explanation of abbreviations, symbols, etc.
  - 10. Numerical door index, indicating the hardware set/ group number for each door.
- C. When universal type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).
- D. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC), or certified Door Hardware Consultant (DHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed or stamped with the DHI certification seal of the supervising AHC or DHC. The supervising AHC or DHC shall attend any meetings related to the project when requested by the architect.
- E. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.
- F. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or incompatible items, and proposed substitutions in the hardware schedule.
- G. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.
- H. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 01 - General Requirements.
- I. Submit a sample of each type of hardware requested by the architect. Samples shall be of the same finish, style, and function as specified herein. Tag each sample with its permanent location so that it may be used in the final work.
- J. Furnish with first submittal, a list of required lead times for all hardware items.
- K. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 01 - General Requirements.
- L. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.
- M. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.
- N. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute's publication "Keying Procedures, Systems, and Nomenclature". Submit copies of owner approved key schedule for review and

field use in quantities as required by Division 01 - General Requirements. Wiring diagrams shall be included in final submittals transmitted for distribution of field use.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function, and quality, may be considered for prior approval of the architect, provided the required data and physical samples are submitted for approval as set forth in Division 01 - General Requirements.
- B. Where indicated in this specification, products shall be independently certified by ANSI for compliance with relevant ANSI/BHMA standards A156.1 - A156.36 – Standards for Hardware and Specialties. All products shall meet or exceed certification requirements for the respective grade indicated within this specification. Supplier shall provide evidence of certification when requested by the architect.
- C. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
- D. Electrical drawings and electrical specifications are based on the specific electrified hardware components specified in hardware sets. When electronic hardware components other than those indicated in hardware sets are provided, the supplier shall be responsible for all costs incurred by the design team and their consultants to review and revise electrical drawings and electrical specifications. Supplier shall also be responsible for any additional costs associated with required changes in related equipment, materials, installation, or final hook up to ensure the system will operate and function as indicated in the construction documents, including hardware set operational / functional descriptions.
- E. All hardware items shall be manufactured no earlier than 6 months prior to delivery to site.
- F. Hardware supplier shall be factory trained and certified by the manufacturer to provide and support all computer managed locks and system components.
- G. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.
- H. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.
- I. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.
- J. Hardware supplier shall participate when reasonably requested to meet with the contractor and or architect to inspect any claim for incorrect or non-functioning materials; following such inspection, the hardware supplier shall provide a written statement documenting the cause and proposed remedy of any unresolved items.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- A. Hardware supplier shall deliver hardware to the job site unless otherwise specified.
- B. All hardware shall be delivered in manufacturers' original cartons and shall be clearly marked with set and door number.
- C. Coordinate with contractor prior to hardware delivery and recommend secure storage and protection against loss and damage at job site.
- D. Contractor shall receive all hardware and provide secure and proper protection of all hardware items to avoid delays caused by lost or damaged hardware. Contractor shall report shortages to the Architect and hardware supplier immediately after receipt of material at the job site.

- E. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

**1.8 PRE-INSTALLATION MEETING**

- A. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.
- B. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.
- C. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

**1.9 WARRANTY**

- A. All hardware items shall be warranted against defects in material and workmanship as set forth in Division 01 - General Requirements.
- B. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner.

**PART 2 - PRODUCTS**

**2.1 FASTENERS**

- A. All exposed fasteners shall be Phillips head or as otherwise specified and shall match the finish of the adjacent hardware. All fasteners ex-posed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.
- B. Coordinate required reinforcements for doors and frames. Seek approval of the architect prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

**2.2 BUTT HINGES**

- A. Acceptable manufacturers and respective catalog numbers:
 

	Ives	Stanley	Hager	McKinney
1. Standard Weight, Plain Bearing	5PB1	F179	****	T2714
2. Standard Weight, Ball Bearing	5BB1	BB179	BB1279	TB2714
3. Standard Weight, Ball Bearing, Non-Ferrous	5BB1	FBB191	BB1191	TB2314
4. Heavy Weight, Ball Bearing	5BB1HW	FBB168	BB1168	T4B3786
5. Heavy Weight, Ball Bearing, Non-Ferrous	5BB1HW	FBB199	BB1199	T4B3386
- B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.1 (2006). Hinges shall meet or exceed the following ANSI grade requirements as indicated below:
  - 1. Standard Weight, Plain Bearing Hinges: Grade 3
  - 2. Standard Weight, 2 Ball Bearing Hinges: Grade 2
  - 3. Heavy Weight, 4 Ball Bearing Hinges: Grade 1
- C. Unless otherwise specified, furnish the following hinge quantities for each door leaf.
  - 1. 3 hinges for doors up to 90 inches.
  - 2. 1 additional hinge for every 30 inches on doors over 90 inches.
  - 3. 4 hinges for Dutch door applications.
- D. Unless otherwise specified, top and bottom hinges shall be located as specified in Division 08 Section "Hollow Metal Doors and Frames". Intermediate hinges shall be located equidistant from others.
- E. Unless otherwise specified, furnish hinge weight and type as follows:
  - 1. Standard weight: plain bearing hinge 5PB1 or ball bearing hinge 5BB1 for interior openings through 36 inches wide without a door closer.

2. Standard weight: ball bearing hinge 5BB1 for interior opening over 36 through 40 inches wide without a door closer, and for interior openings through 40 inches wide with a door closer.
  3. Heavyweight: 4 ball bearing hinge 5BB1HW for interior openings over 40 inches wide, and for all vestibule doors.
  4. Heavyweight: 4 ball bearing hinge 5BB1HWss for exterior openings unless otherwise listed in groups.
  5. Heavyweight: 4 ball bearing hinge 5BB1HWss 5" for all exterior doors or 4 ball bearing hinge 5BB1HW 5" for interior doors, that have an automatic operator.
- F. Unless otherwise specified, furnish hinges for exterior doors, fabricated from brass, bronze, or stainless steel. Unless otherwise specified, hinges for interior doors may be fabricated from steel.
- G. Unless otherwise specified, furnish hinges in the following sizes:
1. 5" x 5"                    2-1/4" thick doors
  2. 4-1/2" x 4-1/2"        1-3/4" thick doors
  3. 3-1/2" x 3-1/2"        1-3/8" thick doors
- H. Furnish hinges with width to accommodate trim and allow for 180-degree swing.
- I. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins at interior doors, non-removable loose pins (NRP) at exterior, and out-swinging lockable interior doors.
- J. Unless otherwise specified, furnish all hinges to template standards.

**2.3 CONTINUOUS PIN AND BARREL HINGES**

- A. Acceptable manufacturers and respective catalog numbers:
- |   |            |            |            |
|---|------------|------------|------------|
|   | Ives       | Markar     | Stanley    |
| 1. Edge Mount Pin & Barrel Stainless Steel Continuous Hinge | 700 Series | 300 Series | 650 Series |
- B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.26, Grade 1 (2012).
- C. Continuous hinges shall be full height pin and barrel type hinge providing full height door support up to 600 lbs. Edge mount (unless noted otherwise).
- D. Construct hinges of heavy-duty 14-gauge material. The stainless internal pin shall have a diameter of 0.25 and the exterior barrel diameter of 0.438.
- E. Hinge shall be non-handed with symmetrical template hole pattern and factory drilled. Hinge must accept a minimum of 21 fasteners on the door and 21 fasteners on the frame.
- F. Each knuckle to be 2 inches, including split nylon bearing at each separation for quiet, smooth, self-lubricating operation.
- G. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours.
- H. Provide machine screws for doors which have been reinforced to accept machine screws.
- I. Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

**2.4 FLUSH BOLTS AND DUST PROOF STRIKES**

- A. Acceptable manufacturers and respective catalog numbers:
- |  |       |               |       |
|--|-------|---------------|-------|
|  | Ives  | Door Controls | Hager |
| 1. Dust Proof Strike                   | DP2   | 80            | 280X  |
| 2. Auto Flush Bolt (Metal Door)        | FB31P | 842           | 292D  |
| 3. Auto Flush Bolt (Wood Door)         | FB41P | 942           | 291D  |
| 4. Constant Latching Bolt (Metal Door) | FB51P | 845           | 293D  |

- |                                       |       |     |      |
|---------------------------------------|-------|-----|------|
| 5. Constant Latching Bolt (Wood Door) | FB61P | 945 | 294D |
| 6. Manual Flush Bolt                  | FB458 | 780 | 282D |
- B. Unless otherwise specified, provide 12" rods for manual flush bolts for door 7'6" or less, 24" top rods for doors over 7'6" to 8'6".
  - C. Unless otherwise specified, provide doors over 8'6" with automatic top bolts.
  - D. Provide automatic flush bolts where required to maintain fire door listing and or egress requirements on pairs of doors.
  - E. All flush-bolt applications shall be UL listed to be installed with top flush-bolt only. Provide auxiliary fire bolt as required for fire rated openings where less bottom bolt has been specified.
  - F. Provide all bottom flush bolts with non-locking dust proof strikes.

**2.5 EXIT DEVICES**

- A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin	Falcon	Corbin
1. Wide Stile, Push Pad	98 / 99 Series	25 Series	ED5000-M110 Series
2. Wide Stile, Electric Latch Retraction	QEL 98 / 99 Series	MEL 25 Series	ED5000S-MELR-M110 Series
3. Lever Trim	996 Series	510L / 511L Series	900 Series
4. Pull Trim	990 Series	512 Series	1300 Series

- A. Exit devices shall be independently certified by ANSI for compliance with ANSI A156.3, Grade 1 (2008).
- B. Obtain exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.
- C. Quiet Electric Latch Retraction shall be accomplished using a motor driven assembly, and shall incorporate the following features:
  - 1. Motor shall retract both the push pad assembly and latchbolt.
  - 2. Automatic calibration of latch throw and pull.
  - 3. Built-in time delay.
  - 4. On-board installation and troubleshooting diagnostics built into power supply and device.
  - 5. Retry mode if device does not pull on the first try.
- D. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.
- E. All exit devices shall be provided with flush end caps to reduce potential damage from impact.
- F. All exit devices shall be provided with dead-locking latch bolts to ensure security.
- G. All exit devices shall be U.L. listed for accident hazard. Exit device for use on fire doors shall also be U.L. listed for fire exit hardware.
- H. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series devices where optional strikes will not accommodate door and frame conditions.
- I. Coordinate with related trades to ensure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.
- J. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR)
- K. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.

- L. Unless specific exit device dogging options are noted within hardware sets, provide dogging options as follows:
  - 1. Fire Rated devices: Dogging not permitted.
  - 2. Non-Rated Exit Only functions not equipped with outside trim or pull: Less Dogging.
  - 3. Non-Rated Classroom functions: Less Dogging.
  - 4. Non-Rated devices utilizing electric latch retraction or electrified outside trim: Less Dogging.
  - 5. All Other Non-Rated devices: Cylinder Dogging utilizing interchangeable core cylinders.  
Cylinder keyway shall match locksets furnished on this project.
- M. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.
- N. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.
- O. Provide Von Duprin #154 or equivalent mullion/frame stabilizers at the following application(s):
  - 1. Lockable exterior or vestibule paired openings with a fixed or removable hollow metal or aluminum mullion.
  - 2. Lockable exterior or vestibule single doors in aluminum frames.
- P. Provide reinforced crossbars for all traditional style exit devices applied to doors over 36" wide.

## 2.6 LOCKS AND LATCHES

- A. Acceptable manufacturers and respective catalog numbers:
 

	Schlage	No Substitution
1. Grade 1 Mortise	L Series 17A	
2. Grade 1 Cylindrical	ND Series SPA	
3. Grade 2 Deadbolt	B500 Series	
- B. Bored locks shall be independently certified by ANSI for compliance with ANSI A156.2 (2011). Interconnected locks shall be independently certified by ANSI for compliance with ANSI A156.12 (2013). Mortise locks shall be independently certified by ANSI for compliance with ANSI A156.13 (2012).
- C. Minimize transmission of heat to lock trim. Provide temperature control modules (TCM) on all electrified locks when cataloged by the lock manufacturer.
- D. Unless otherwise specified, all locks and latches to have:
  - 1. 2-3/4" Backset
  - 2. 1/2" minimum throw latchbolt
  - 3. 1" throw deadbolt
  - 4. 6 pin cylinders
  - 5. ANSI A115.2 strikes
- E. Interconnected locks shall accommodate center to center dimensions of 4" or 5-1/2" between deadbolt and latch.
- F. Provide guarded latch bolts for all locksets, and latch bolts with throw to maintain fire rating of both single and paired door assemblies.
- G. Provide strike with lip length adequate to clear surrounding trim.
- H. Provide Von Duprin #154 or equivalent mullion/frame stabilizers at the following application(s) unless provided with deadbolt:
  - 1. Lockable exterior or vestibule paired openings with a fixed or removable hollow metal or aluminum mullion.
  - 2. Lockable exterior or vestibule single doors in aluminum frames.
- I. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.

## 2.7 PULLS, PUSH BARS, PUSH/PULL PLATES

- A. Acceptable manufacturers and respective catalog numbers:

	Burns	Hager	Ives
1. Straight Pull (1" dia., 10" CTC)	26C	4J	8103-0
2. Straight Pull (3/4" dia., 8" CTC)	25B	3G	8102-8
3. Offset Door Pull (1" dia., 10" CTC)	39C	12J	8190-0
4. Offset Pull (1" dia., 18" CTC Pull)	39G	23Q	8190-18
5. Pull / Push-Bar (1" dia., 10" CTC Pull)	422 x 26C	153	9103-0
6. Offset Pull / Push-Bar (1" dia., 10" CTC Pull)	422 x 39C	159	9190-0
7. Offset Pull / Push-Bar (1" dia., 18" CTC Pull)	422 x 39G	161	9190-18
8. Push Plate (.050 4"X 16")	54	30S 4 x 16	8200 4 x 16
9. Push Plate (.050 6"X 16")	56	30S 6 x 16	8200 6" X 16"
10. Pull Plate (1" dia., 10" CTC - .050" X 4" X 16")	5426C	34J 4 x 16	8303-0 4" X 16"

- A. Adjust dimensions of push plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, push plates shall be factory drilled for cylinders or other mortised hardware. All push plates shall be beveled 4 sides and counter sunk.
- B. Where possible, provide back-to-back, and concealed mounting for pulls and push bars. Push bar length shall be 3" less door width, or center of stile to center of stile for stile & rail or full glass doors.

## 2.8 COORDINATORS

- A. Acceptable manufacturers and respective catalog numbers:

	Ives	Door Controls	Hager
1. Bar Coordinator	COR x FL	600 x Filler	297D x 297F
2. Mounting Bracket	MB Series	AB, C Series	297 Series
- B. Provide coordinators at all pairs of doors having automatic flush bolts and closers on the inactive leaf, and for pairs of doors having vertical rod/mortise exit device combinations with overlapping astragals.
- C. Provide appropriate filler bars, closer mounting brackets, carry bars, and special top latch preparations as required by adjacent hardware.

## 2.9 CLOSERS (ALUMINUM)

- A. Acceptable manufacturers and respective catalog numbers:

	LCN	Yale	Norton
1.	4050A / 4050A EDA	R4400 / PR4400	R7500 / PR7500
2.	1450A / 1450A EDA FC	3501 FC	8501 FC
- B. Door closers shall be independently certified by ANSI for compliance with ANSI A156.4, Grade 1 (2013).
- C. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.
- D. Provide extra heavy-duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.
- E. Hardware supplier shall coordinate with related trades to ensure aluminum frame profiles will accommodate specified door closers.
- F. Closers shall use aluminum cylinders.
- G. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.
- H. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.
- I. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.



- J. Provide closers with adjustable spring power. Size closers to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.
- K. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.
- L. Closers shall be furnished complete with all mounting brackets and cover plates as required by door and frame conditions, and by adjacent hardware.
- M. Door closers shall be provided with a powder coat finish to provide superior protection against the effects of weathering. Powder coat finish shall successfully pass a 100-hour salt spray test.

## 2.10 LOW ENERGY ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

- A. Acceptable manufacturers and respective catalog numbers:
 

	LCN	Besam	No Substitution
1. Electro-Hydraulic Operator	4640	PowerSwing	
- B. Low energy operators shall be independently certified by ANSI for compliance with ANSI A156.19 (2002).
- C. Where low kinetic energy, as defined by ANSI/BHMA Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered operators complying with the ADA for opening force and time to close standards.
- D. The closing action shall be controlled by modern type cast iron door closer cylinder filled with a flat viscosity fluid, stable from +120F to -30F that would require no seasonal adjustments. The closer shall have field adjustable spring power; have two independent closing speed adjustment valves, and hydraulic back-check.
- E. Full closing force shall be provided when the power or assist cycle ends.
- F. All power operator systems shall include the following features and functions:
  - 1. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, section 725-31.
  - 2. The operator will be designed with an electronically controlled mechanical clutching mechanism to prevent damage to the operator if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.
  - 3. All covers, mounting plates and arm systems shall be powder coated and successfully pass a minimum of 100 hours testing as outlined in ANSI/BHMA Standard A156.18.
  - 4. UL listed for use on labeled doors.
  - 5. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.
  - 6. The power operator shall incorporate microprocessor controlled digital controls including factory default memory settings, on-board diagnostics, non-volatile memory, and integrated delay and relay for controlling door release devices.
  - 7. Provisions in the control box or module shall provide control {inputs and outputs} for; electric strike delay, auxiliary contacts, sequential operation, fire alarms systems, actuators, swing side sensors, and stop side sensors.
  - 8. Wall mounted actuators shall consist of a 4-1/2 inches diameter stainless steel touch plate with a blue filled handicapped symbol. Switches shall be weather resistant and mount on a single gang electrical box furnished by Division 26.
- G. All electrically powered operators shall include the following features or functions:
  - 1. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
  - 2. Easily accessible main power and maintain hold open switches will be provided on the operator.
  - 3. An electronically controlled clutch to provide adjustable opening force.

- 4. A microprocessor to control all motor and clutch functions.
  - 5. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
  - 6. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.
  - 7. If electrical failure occurs, the unit shall operate as a standard door closer.
- H. Power Operators shall be warranted by the manufacture to be free from defects in material and workmanship for a period of two years.

**2.11 KICK PLATES AND MOP PLATES**

- A. Furnish protective plates as specified in hardware groups.
- B. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.
- C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk.
- D. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing. When protection plates over 16" are provided for labeled doors, the plate shall be labeled.
- E. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.
- F. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

**2.12 OVERHEAD STOPS**

- A. Acceptable manufacturers and respective catalog numbers:
 

	Glynn-Johnson	Rixson	Sargent
1. Heavy Duty Surface Mount	GJ900 Series	9 Series	590
2. Heavy Duty Concealed Mount	GJ100 Series	1 Series	690
3. Medium Duty Surface Mount	GJ450 Series	10 Series	1540
- B. Unless otherwise specified, furnish GJ900 series overhead stop for hollow metal or 1-3/4" solid core doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for hollow metal or 1-3/4" solid core doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.
- C. Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.
- D. Do not provide holder function for labeled doors.

**2.13 WALL STOPS AND HOLDERS**

- A. Acceptable manufacturers and respective catalog numbers:
 

	Ives	Hager	Burns
1. Wrought Convex Wall Stop	WS406CVX	232W	570
2. Wrought Concave Wall Stop	WS406CCV	236W	575
3. Automatic Wall Holder	WS40	326W	533
- B. Furnish a stop or holder for all doors. Furnish floor stops or hinge pin stops only where specifically specified.
- C. Provide concave style wall stop at all adjacent integral push button locks; provide convex style wall stop at all other locations.
- D. Where wall stops are not applicable, furnish overhead stops.

E. Do not provide holder function for labeled doors.

## 2.14 MAGNETIC HOLD OPENS

A. Acceptable manufacturers and respective catalog numbers:

	LCN	ABH	Edwards
1. Wall Holder	SEM 7800	2000	1500

B. Magnetic hold opens shall be independently certified by ANSI for compliance with ANSI A156.15, Grade 1 (2006).

C. Magnetic holder's housing and armature shall be constructed of a die cast zinc material.

D. Provide types as listed in groups.

E. Where wall conditions do not permit the armature to reach the magnet, provide extensions.

F. Provide proper voltage and power consumption as required by Division 16.

G. Coordinate electrical requirements and mounting locations with other trades.

## 2.15 WEATHERSTRIP, GASKETING

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Weatherstrip	429	2891_PK	700NA	755
2. Adhesive Gasket	188	S88	5050	797
3. Mullion Seal/Silencer	8780	5110	5100N	
4. Meeting Edge Seals	8193	18041	9605	959
5. Automatic Door Bottom (Surface Mtd.)	321	4131	222	320
6. Automatic Door Bottom (HD Concealed) (When Sealing Against A Solid Surface)	360	434_RL	423N	430
7. Automatic Door Bottom (HD Concealed) (When Sealing Against Carpet)	360	434_NBL	683	943
8. Sweep (Neoprene)	39	315_N	200N	323
9. Sweep w/ drip	8198	345_N	C627	354
10. Drip Cap	142	346	16	R201

B. Weatherstrip and gasketing shall be independently certified by ANSI for compliance with ANSI A156.22 (2005).

C. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

D. Provide weatherstripping all exterior doors and where specified.

E. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

F. Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.

G. Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

## 2.16 THRESHOLDS

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Saddle Thresholds	8655	171	425	S205
2. Half Saddle Thresholds	1674	227	324	S239
3. Interlocking Threshold	74A	114	442-5	T550
4. ¼" Saddle Thresholds	63	151	411	S263

A. Thresholds shall be independently certified by ANSI for compliance with ANSI A156.21 (2001).

- B. Hardware supplier shall verify all finish floor conditions and coordinate proper threshold as required to ensure a smooth transition between threshold and interior floor finish.
- C. Threshold Types:
  1. Unless otherwise specified, provide saddle threshold similar to Zero 8655 for all exterior openings with an interior floor finish less than or equal to 1/4" in height.
  2. Unless otherwise specified, provide half saddle threshold similar to Zero 1674 for all exterior openings with an interior floor finish greater than 1/4" in height. Threshold height shall match thickness of interior floor finish.

**2.17 POWER SUPPLIES**

- A. Provide quantities and types as specified in hardware sets. Shared power supplies will not be accepted without prior approval from the owner.
- B. All power supplies shall have the following features:
  1. 12/24 VDC Output, field selectable.
  2. Class 2 Rated power limited output.
  3. Universal 120-240 VAC input.
  4. Low voltage DC regulated and filtered.
  5. Polarized connector for distribution boards.
  6. Fused primary input.
  7. AC input and DC output monitoring circuit w/LED indicators.
  8. Cover mounted AC Input indication.
  9. Tested and certified to meet UL294.
  10. NEMA 1 enclosure.
  11. Hinged cover w/lock down screws.
  12. High voltage protective cover.
- C. All power supplies shall incorporate fused distribution boards.
- D. All electro-mechanical systems requiring fail safe circuits shall be capable of interfacing with the fire alarm system to cut power to appropriate system components. Unless already provided in another system component, all power supplies utilized in fail safe circuits shall include an integral relay which when connected to the N/C fire alarm contact will cut power to all openings connected to the individual power supply. Power supply, unless otherwise specified, will automatically reset itself when fire alarm relay returns to normal state following a fire alarm.

**2.18 DOOR POSITION SWITCHES**

- A. Acceptable manufacturers and respective catalog numbers:
 

	Schlage Electronics	GEI	Sargent
1. Concealed (wood & hollow metal doors)	679 Series	1076W	3287
2. Concealed (aluminum doors)	7764	*****	****

**2.19 MANUALLY PROGRAMMED LOCKS**

- A. Acceptable manufacturers and respective catalog numbers:
 

	Schlage Electronics
1. Cylindrical Lockset	CO100-CY Series
- B. Provide locks with mechanical key override.
- C. Provide cylinders as required
- D. Lever trim shall match locksets when available.
- E. Bored locks shall be independently certified by ANSI for compliance with ANSI A156.2, Grade 1 (2011). Mortise locks shall be independently certified by ANSI for compliance with ANSI A156.13, Grade 1 (2012).
- F. Lockset shall be listed and certified for compliance with UL 294.
- G. Keypad operation to include the following:

1. Momentary unlock time.
  2. Maintained unlock and re-lock.
  3. Freeze command.
  4. Pass Through command,
  5. 500 user codes.
  6. LED's for visual programming acknowledgement.
  7. Linked Access allowing multiple functions from a single credential when combined with multiple PIN codes.
- H. Hardware supplier shall be factory trained and certified by the manufacture to provide and support all computer managed locks and system components.
- I. Hardware supplier shall provide onsite training to the end user as required by the manufacturer.

## 2.20 FINISHES AND BASE MATERIALS

- A. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

HARDWARE ITEM	BHMA FINISH AND BASE MATERIAL
1. Butt Hinges: Exterior, or Non-Ferrous	630 (US32D - Satin Stainless Steel)
2. Butt Hinges: Interior	652 (US26D - Satin Chromium)
3. Continuous Hinges	630 (US32D - Satin Stainless Steel)
4. Flush Bolts	626 (US26D - Satin Chromium)
5. Exit Devices	626 (US26D - Satin Chromium)
6. Locks and Latches	626 (US26D - Satin Chromium)
7. Pulls and Push Plates/Bars	630 (US32D - Satin Stainless Steel)
8. Coordinators	600 (Prime painted or mill alum.)
9. Closers	689 (Powder Coat Aluminum)
10. Protective Plates	630 (US32D - Satin Stainless Steel)
11. Overhead Stops	630 (US32D - Satin Stainless Steel)
12. Wall Stops and Holders	630 (US32D - Satin Stainless Steel)
13. Thresholds	719 (Mill Aluminum)
14. Weather-strip, Sweeps Drip Caps (wood and hollow metal doors)	Aluminum Anodized
15. Weather-strip, Sweeps Drip Caps (aluminum doors)	Match finish of aluminum doors.
16. Magnetic Holders	689 (Powder Coat Aluminum)
17. Miscellaneous	626 (US26D - Satin Chromium)

## 2.21 KEYING

- A. Provide all cylinders in keyways as required to accommodate owners existing Schlage key system.
- B. Provide interchangeable cores for all locks and cylinders if required per the key system.
- C. All locks under this section shall be keyed as directed by the owner to an existing Master Key System.
- D. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.
- E. Master keys, control keys, and change keys shall be delivered by registered mail to the owner. Construction keys shall be delivered to the contractor.

## 2.22 KEY CABINETS

- A. Acceptable manufacturers and respective catalog numbers:
- |                 |             |         |
|-----------------|-------------|---------|
| Lund            | Key Control | Telkee  |
| 1. 1200-1205 AA | M228-2480   | RWC-AWC |
- B. Furnish 1 each model 1200 or 1205 AA key cabinet with a capacity 1.5 times the number of key sets.

- C. Provide one key cabinet with at least one hook for each key set, plus additional hooks for 50% expansion.
- D. Furnish key cabinet complete with cam lock, permanent key tags, and change key cards.
- E. Hardware supplier shall prepare all key change index records, tag all keys and place permanent file keys in cabinet.

### **2.23 FIRE DEPARTMENT ACCESS BOX**

- A. Acceptable manufacturers, subject to compliance with specified requirements, acceptable manufacturers and products are:
  - 1. Dama, S3 (surface-mount)
  - 2. Dama, R3 (recessed mount)
  - 3. Knox-Box, 3200 Series
  - 4. Tru-Lock (recessed mount), Eau Claire, WI
- B. Verify manufacturer is acceptable to local Fire Department.
- C. Requirements:
  - 1. Coordinate keying requirements with the authority having jurisdiction.
  - 2. Verify surface or flush mount box with E/A.
  - 3. Finish: Corrosion resistant.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Prior to installation of hardware, installer shall examine door frame installation to ensure frames have been set square and plumb. Installer shall examine doors, door frames, and adjacent wall, floor, and ceiling for conditions, which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

### **3.2 INSTALLATION**

- A. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar with a 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices, continuous hinges and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical products samples.
- B. Install all hardware in accordance with the approved hardware schedule and manufacturer's instructions for installation and adjustment.
- C. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Provide blocking or reinforcement for all hardware mounted to drywall construction, including wall mounted door stops and holders.
- E. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.
- F. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.
- G. Shim doors as required to maintain proper operating clearance between door and frame.
- H. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute.

- I. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.
- J. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.
- K. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.
- L. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the label.
- M. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.
- N. Install hardware in accordance with supplemental "S" label instructions on all fire rated openings.
- O. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework, or equipment.
- P. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.
- Q. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.
- R. Install door closers on corridor side of lobby doors, room side of corridor doors, and stair side of stairways.
- S. Adjust spring power of door closers to the minimum force required to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to ensure opening force does not to exceed 5 lbs.
- T. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door throughout the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building codes.
- U. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel arm door closers, exit devices, etc., as required to accommodate weatherstripping.
- V. Unless otherwise specified or detailed, install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.
- W. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water-resistant seal.
- X. Deliver to the owner 1 complete set of installation and adjustment instructions, and tools as furnished with the hardware.

### **3.3 FIELD QUALITY CONTROL**

- A. After installation has been completed, the hardware supplier and manufacturers representative for locksets, door closers, exit devices, and overhead stops shall check the project and verify compliance with installation instructions, adjustment of all hardware items, and proper application according to the approved hardware schedule. Hardware supplier shall submit a list of all hardware that has not been installed correctly.
- B. After installation has been completed, the hardware supplier and manufacturers representative shall meet with the owner to explain the functions, uses, adjustment, and maintenance of each item of hardware. Hardware supplier shall provide the owner with a copy of all wiring diagrams. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

### **3.4 ADJUSTMENT AND CLEANING**

- A. At final completion, and when H.V.A.C. equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. Lubricate moving parts with type lubrication recommended by the manufacturer.
- B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective, or inoperative shall be repaired or replaced.

**3.5 HARDWARE SCHEDULE**

- A. The following schedule of hardware groups are intended to describe opening function. The hardware supplier is cautioned to refer to the preamble of this specification for a complete description of all materials and services to be furnished under this section.

60200 OPT0226846

**HW SET: 01**

1	EA	CONT. HINGE	700 EPT	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL-OP	VON
1	EA	MULLION STABILIZER	154	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR	8310-856	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIP	BY DR/FR SUPPLIER	
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	PROFILE AS REQUIRED	ZER
1		REMOTE RELEASE	BY SECURITY SUPPLIER	BYO
1	EA	CARD READER	BY SECURITY SUPPLIER	BYO
1	EA	DOOR CONTACT	7764	SCE
1	EA	POWER SUPPLY	PS902 4RL	VON
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED. PRESENTATION OF VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR. ACCESS CONTROL SYSTEM CONTROLS MOMENTARY OR EXTENDED PERIODS OF LATCH RETRACTION. ACCESS CONTROL SYSTEM TO CONTROL OUTSIDE ACTUATOR. INSIDE ACTUATOR ALWAYS ACTIVE TO MOMENTARILY RETRACT LATCH AND OPEN DOOR.



**HW SET: 02**

1	EA	CONT. HINGE	700 EPT	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL-OP	VON
1	EA	MULLION STABILIZER	154	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	DOOR PULL, 1" ROUND	8103 10"	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR	8310-856	LCN
1		REMOTE RELEASE	BY SECURITY SUPPLIER	BYO
1	EA	CARD READER	BY SECURITY SUPPLIER	BYO
1	EA	POWER SUPPLY	PS902 4RL	VON
1	EA	ELEVATION DRAWING		
1	EA	WIRE DIAGRAM	POINT TO POINT	

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED. PRESENTATION OF VALID CREDENTIAL MOMENTARILY UNLOCKS DOOR. ACCESS CONTROL SYSTEM CONTROLS MOMENTARY OR EXTENDED PERIODS OF LATCH RETRACTION. ACCESS CONTROL SYSTEM TO CONTROL OUTSIDE ACTUATOR. INSIDE ACTUATOR ALWAYS ACTIVE TO MOMENTARILY RETRACT LATCH AND OPEN DOOR.

**HW SET: 03**

	EA	HINGE	AS REQUIRED	IVE
1		IC CYLINDER	AS REQUIRED	SCH
1	EA	PANIC HARDWARE	LD-99-EO	VON
1	EA	ELEC PANIC HARDWARE	RX-ALK-LD-99-EO	VON
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	4050A EDA ST-5004	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIP	429	ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	PROFILE AS REQUIRED	ZER
1	EA	DOOR CONTACT	679-05	SCE

FUNCTION: (EO) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD. NO EXTERIOR TRIM. RX IN PUSHBAR INITIATES INTERNAL BATTERY OPERATED ALARM. KEY IN CYLINDER CONTROLS THE ALARM.

**HW SET: 04**

	EA	HINGE	AS REQUIRED	IVE
1	EA	PANIC HARDWARE	LD-99-NL	VON
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	SURFACE CLOSER	4050A SHCUSH	LCN
1	EA	ARMOR PLATE	8400 34" X 2" LDW B-CS	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	WEATHERSTRIP	429	ZER
1	EA	DOOR SWEEP W/DRIP	8198	ZER
1	EA	THRESHOLD	PROFILE AS REQUIRED	ZER
1	EA	DOOR CONTACT	679-05	SCE

FUNCTION: (NL) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED.

**HW SET: 05**

	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10S	SCH
1	EA	DBL CYL DEADBOLT	B562	SCH
1	EA	SURFACE CLOSER	4050A RW/PA PULL SIDE MOUNT	LCN
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER
1	EA	MORTISE DOOR BOTTOM	360	ZER

FUNCTION: PASSAGE LATCH  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES.

**HW SET: 06**

	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10S	SCH
1	EA	DBL CYL DEADBOLT	B562	SCH
1	EA	OH STOP	450S	GLY
1	EA	SURFACE CLOSER	4050A RW/PA PULL SIDE MOUNT	LCN
1	EA	GASKETING	188S	ZER
1	EA	MORTISE DOOR BOTTOM	360	ZER

FUNCTION: PASSAGE LATCH  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES.

**HW SET: 07**

	EA	HINGE	AS REQUIRED	IVE
1	EA	PASSAGE SET	ND10S	SCH
1	EA	SGL CYL DEADBOLT	B560	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	LCN
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER

FUNCTION: PASSAGE LATCH  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES.

**HW SET: 08**

1	EA	PASSAGE SET	ND10S	SCH
1	EA	SGL CYL DEADBOLT	B560	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	LCN
1	EA	GASKETING	188S	ZER
1	EA	BALANCE OF HARDWARE	TO REMAIN	

FUNCTION: PASSAGE LATCH  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES.

**HW SET: 09**

1	EA	PUSH PLATE	8200 6" X 16"	IVE
1	EA	PULL PLATE	8302 10" 4"X16"	IVE
1	EA	BALANCE OF HARDWARE	TO REMAIN	

REMOVE EXISTING LATCH DEVICE

**HW SET: 10**

1	EA	GASKETING	188S	ZER
1	EA	SURFACE DOOR BOTTOM	321	ZER
1	EA	BALANCE OF HARDWARE	TO REMAIN	

**HW SET: 11**

1	EA	GASKETING	188S	ZER
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**HW SET: 12**

	EA	HINGE	AS REQUIRED MATCH EXIST SIZE & WEIGHT @ EXIST FRAME	IVE
1	EA	PRIVACY W/OCC IND	L9456 L283-722	SCH
1	EA	SURFACE CLOSER	4050A RW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER

FUNCTION: CORRIDOR LOCK  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE. DEADBOLT THROWN OR RETRACTED BY KEY  
OUTSIDE OR INSIDE THUMBTURN. THROWING DEADBOLT LOCKS OUTSIDE LEVER. TURNING INSIDE  
LEVER SIMULTANEOUSLY RETRACTS DEADBOLT AND LATCHBOLT AND UNLOCKS OUTSIDE LEVER.  
OUTSIDE INDICATOR DISPLAYS OCCUPIED/VACANT

**HW SET: 13**

	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRANCE LOCK	ND53	SCH
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: OFFICE AND INNER ENTRY LOCK  
 LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS MADE INOPERATIVE BY KEY OUTSIDE OR BY TURNING INSIDE THUMBTURN. WHEN OUTSIDE IS LOCKED, LATCHBOLT IS RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER REMAINS LOCKED UNTIL THUMBTURN IS RETURNED TO VERTICAL OR UNLOCKED BY KEY. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 14**

1	EA	ENTRANCE LOCK	ND53	SCH
1	EA	BALANCE OF HARDWARE	TO REMAIN	

FUNCTION: OFFICE AND INNER ENTRY LOCK  
 LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS MADE INOPERATIVE BY KEY OUTSIDE OR BY TURNING INSIDE THUMBTURN. WHEN OUTSIDE IS LOCKED, LATCHBOLT IS RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER REMAINS LOCKED UNTIL THUMBTURN IS RETURNED TO VERTICAL OR UNLOCKED BY KEY. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 15**

	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRANCE LOCK	ND53	SCH
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER
1	EA	MORTISE DOOR BOTTOM	360	ZER

FUNCTION: OFFICE AND INNER ENTRY LOCK  
 LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS MADE INOPERATIVE BY KEY OUTSIDE OR BY TURNING INSIDE THUMBTURN. WHEN OUTSIDE IS LOCKED, LATCHBOLT IS RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER REMAINS LOCKED UNTIL THUMBTURN IS RETURNED TO VERTICAL OR UNLOCKED BY KEY. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 16**

	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRANCE LOCK	ND53	SCH
1	EA	SURFACE CLOSER	4050A REG OR EDA AS REQ	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER
1	EA	MORTISE DOOR BOTTOM	360	ZER

FUNCTION: OFFICE AND INNER ENTRY LOCK  
 LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS MADE INOPERATIVE BY KEY OUTSIDE OR BY TURNING INSIDE THUMBTURN. WHEN OUTSIDE IS LOCKED, LATCHBOLT IS RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER REMAINS LOCKED UNTIL THUMBTURN IS RETURNED TO VERTICAL OR UNLOCKED BY KEY. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 17**

	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: CLASSROOM LOCK  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS LOCKED BY KEY. UNLOCKED FROM OUTSIDE BY KEY. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED..

**HW SET: 18**

	EA	HINGE	AS REQUIRED	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	SURFACE CLOSER	4050A HW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: CLASSROOM LOCK  
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS LOCKED BY KEY. UNLOCKED FROM OUTSIDE BY KEY. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 19**

	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	4050A REG OR EDA AS REQ	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: STOREROOM LOCK  
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 20**

1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	LCN
1	EA	BALANCE OF HARDWARE	TO REMAIN	

FUNCTION: STOREROOM LOCK  
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 21**

	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	4050A HW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: STOREROOM LOCK  
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE.  
AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 22**

	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	4050A HW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FUNCTION: STOREROOM LOCK  
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE.  
AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 23**

	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	4050A REG OR EDA AS REQ	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER

FUNCTION: STOREROOM LOCK  
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE.  
AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 24**

	EA	HINGE	AS REQUIRED	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	4050A RW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	FIRE/LIFE WALL MAG	SEM7800	LCN
1	EA	GASKETING	188S	ZER

FUNCTION: STOREROOM LOCK  
LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE.  
AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.  
MAGNETIC HOLD OPEN IS NORMALLY ENERGIZED. LOSS OF POWER, ACTIVATION OF FIRE ALARM OR  
THE DURESS SYSTEM DEENERGIZES IT.

**HW SET: 25**

	EA	HINGE	AS REQUIRED	IVE
1	EA	MANUAL FLUSH BOLT	FB458	IVE
1	EA	CONST LATCHING BOLT	FB51T	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	STOREROOM LOCK	ND80	SCH
2	EA	OH STOP	450S	GLY

FUNCTION: STOREROOM LOCK

LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

**HW SET: 26**

	EA	HINGE	AS REQUIRED	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP	SCE
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	SURFACE CLOSER	1450 RW/PA FC	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	FIRE/LIFE WALL MAG	SEM7800	LCN

LOCKSET IS NORMALLY SECURE. INSIDE LEVER ALWAYS ALLOWS FREE EGRESS. VALID TOGGLE CREDENTIALS ON THE EXTERIOR MAY BE USED TO CHANGE TO A PASSAGE OR SECURED STATUS. MAGNETIC HOLD OPEN IS NORMALLY ENERGIZED. LOSS OF POWER OR ACTIVATION THE DURESS SYSTEM DEENERGIZES IT.

**HW SET: 27**

	EA	HINGE	AS REQUIRED	IVE
1	EA	ELEC CLASSROOM LOCK	CO-100-CY-70-KP	SCE
1	EA	IC CYLINDER	AS REQUIRED	SCH
1	EA	OH STOP	90S	GLY
1	EA	SURFACE CLOSER	4050A RW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

LOCKSET IS NORMALLY SECURE. INSIDE LEVER ALWAYS ALLOWS FREE EGRESS. VALID TOGGLE CREDENTIALS ON THE EXTERIOR MAY BE USED TO CHANGE TO A PASSAGE OR SECURED STATUS.

**HW SET:28**

	EA	HINGE	AS REQUIRED	IVE
1	EA	ENTRANCE LOCK	ND53	SCH
1	EA	SURFACE CLOSER	4050A RW/PA PULL SIDE MOUNT	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	GASKETING	188S	ZER

FUNCTION: OFFICE AND INNER ENTRY LOCK

LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS MADE INOPERATIVE BY KEY OUTSIDE OR BY TURNING INSIDE THUMBTURN. WHEN OUTSIDE IS LOCKED, LATCHBOLT IS RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER REMAINS LOCKED UNTIL THUMBTURN IS RETURNED TO VERTICAL OR UNLOCKED BY KEY. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

HW SET:29

	EA	HINGE	AS REQUIRED	IVE
1	SET	AUTO FLUSH BOLT	AUTOMATIC	IVE
1	EA	DUST PROOF STRIKE	DP2	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	COORDINATOR	COR X FL	IVE
2	EA	MOUNTING BRACKET	MB	IVE
2	EA	SURFACE CLOSER	4050A CUSH	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FUNCTION: STOREROOM LOCK

LATCHBOLT RETRACTED BY KEY OUTSIDE OR BY LEVER INSIDE. OUTSIDE LEVER ALWAYS INOPERATIVE.  
AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.



Door / Hardware Index

Door Numbers	HwSet#
100	07
106	07
106A	06
109A	19
150	07
151	03
152	07
153	07
153A	05
154	07
154A	05
155	12
156	12
159	07
159A	06
160	23
160A	19
161A	16
161B	16
163	15
164	15
166	18
240	29
250	07
251A	03
252	07
253	07
253A	05
254	07
254A	05
255	12
256	12
258	07
258A	06
259	07
260	07
260A	06
261	24
262A	13
262B	13
262C	13
262D	26
263	04
264	27
264A	19
265	28
266	28
267	23
267A	22

Door Numbers	HwSet#
268	24
271.1	01
271.2	02
271A	17
E102	11
E103	12
E104	12
E109	14
E112	08
E119	10
E120	10
E122	10
E133	10
E134A	20
E200	11
E200A	10
E202	11
E203	12
E204	12
E206	11
E206	11
E207	11
E207A	10
E240	09



## SECTION 08 80 00

### GLAZING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

##### 1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Door and Frames: Glazed borrowed lites.
- B. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished by storefront manufacturer; shall meet state Energy Compliances.

##### 1.03 REFERENCE STANDARDS

- A. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1036 - Standard Specification for Flat Glass; 2011e1.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- F. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2009.
- G. GANA (SM) - GANA Sealant Manual; Glass Association of North America; 2008.
- H. ICC (IBC) - International Building Code; 2015.

##### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

##### 1.05 PERFORMANCE REQUIREMENTS

- A. Provide glass and glazing materials for continuity of building enclosure vapor retarder and air barrier:
  - 1. In conjunction with vapor retarder and joint sealer materials described in other sections.
  - 2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

##### 1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

##### 1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

##### 1.08 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

## 1.09 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

## PART 2 PRODUCTS

### 2.01 GLASS MATERIALS

- A. Float Glass Manufacturers:
  - 1. AGC Flat Glass North America, Inc: [www.na.agc-flatglass.com](http://www.na.agc-flatglass.com).
  - 2. Guardian Industries Corporation: [www.guardian.com](http://www.guardian.com).
  - 3. Pilkington North America Inc: [www.pilkington.com/na](http://www.pilkington.com/na).
  - 4. PPG Industries, Inc: [www.ppgideascales.com](http://www.ppgideascales.com).
  - 5. Visteon Glass Systems: [www.visteon.com/floatglass](http://www.visteon.com/floatglass).
  - 6. Viracon.
  - 7. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- B. Float Glass: Provide float glass based glazing unless noted otherwise.
  - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
  - 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
  - 3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
  - 4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.
- C. Fire Resistance-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings.
  - 1. IBC Fire Resistance Rating: W-45, minimum.
  - 2. Provide products listed by Underwriters Laboratories or Intertek Warnock Hersey.
  - 3. Safety Certification: 16 CFR 1201 Category II.
- D. Fire-Protection-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings.
  - 1. IBC Fire Protection Rating: As indicated on drawings.
  - 2. Provide products listed by Underwriters Laboratories or Intertek Warnock Hersey.
  - 3. Labeling: Provide permanent label on each piece giving the IBC rating and other information required by the applicable code.
- E. Clear Float Glass: Clear, annealed.
  - 1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
  - 2. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 1, Quality q3 glazing select.
  - 3. 1/4 inch thick.
- F. Safety Glass: Clear; fully tempered with horizontal tempering.
  - 1. Comply with ASTM C 1048, Condition A uncoated, Type I, transparent flat, Class 1, Quality q3 glazing select.
  - 2. Comply with ANSI Z97.1.
  - 3. 1/4 inch thick, interior glazing.
- G. Laminated Glass: 1/2" Laminated Glazing.
  - 1. Comply with ASTM C 1048
- H. Ballistic Glazing: Total Security Solutions or approved equal; level 8.

### 2.02 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
  - 1. Any of the manufacturers specified for float glass.
  - 2. Substitutions: Refer to Section 01 60 00 - Product Requirements.

- B. Sealed Insulating Glass Units: Types as indicated.
  - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  - 2. Edge Spacers: Aluminum, bent and soldered corners.
  - 3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
  - 4. Purge interpane space with dry hermetic air.
- C. Insulated Glass Units: Double pane with glass to elastomer edge seal.
  - 1. Outer pane of 1/4 inch glass, inner pane of 1/4 inch glass
  - 2. Place reflective coating on No. 3 surface within the unit.
  - 3. Comply with ASTM E 774 and E 773, Class CBA.
  - 4. Purge interpane space with dry hermetic air.
  - 5. Total unit thickness of 1 inch.
- D. Tempered Insulated Glass Units: Double pane with glass to elastomer edge seal.
  - 1. Outer pane of 1/4 inch tempered glass, inner pane of 1/4 inch tempered glass.
  - 2. Place reflective coating on No. 3 surface within the unit.
  - 3. Comply with ASTM E 774 and E 773, Class CBA.
  - 4. Purge interpane space with dry hermetic air.
  - 5. Total unit thickness of 1 inch.
- E. Insulated Spandrel Glass Units (Type SG): Double Pane with glass to elastomer edge seal.
  - 1. Outer pane of 1/4 inch heat strengthened glass, inner pane of 1/4 inch ceramic frit fused to the outer surface, color as selected by Architect.
  - 2. Comply with ASTM C 1048, Condition B spandrel glass one surface coated Type II pattern flat, Class 2 tinted heat absorbing and light reducing, Quality q7 decorative.
  - 3. Comply with ASTM C 1036 Type I, transparent flat, Class 2 tinted heat absorbing and light reducing.
  - 4. Total unit thickness of 1 inch.
- F. Insulated Silkscreen Glass Units (Silkscreen & Tempered): Triple Pane with glass to elastomer edge seal.
  - 1. Outer panes of 1/4 inch heat strengthened glass, inner pane of 1/4 inch ceramic frit fused to the outer surface, color as selected by Architect.
  - 2. Comply with ASTM C 1048, Condition C other coated glass one surface coated Type II pattern flat, Class 2 tinted heat absorbing and light reducing, Quality q7 decorative.
  - 3. Comply with ASTM C 1036 Type I, transparent flat, Class 2 tinted heat absorbing and light reducing.
  - 4. Total unit thickness of 1 inch.

### **2.03 GLAZING COMPOUNDS**

- A. Manufacturers:
  - 1. Dow Corning Corp: [www.dowcorning.com](http://www.dowcorning.com).
  - 2. GE Plastics: [www.geplastics.com](http://www.geplastics.com).
  - 3. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 4. Substitutions: Refer to Section 01 60 00 - Product Requirements.
- B. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color.

### **2.04 GLAZING ACCESSORIES**

- A. Manufacturers:
  - 1. Norton Performance Plastics Corp.
  - 2. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 3. Tremco, Inc: [www.tremcosealants.com](http://www.tremcosealants.com).
  - 4. Substitutions: Refer to Section 01 60 00 - Product Requirements.

- B. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.
- D. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
- E. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I.
- F. Glazing Clips: Manufacturer's standard type.
- G. Transaction Window: CRL Cashier windows or approved equal.
  1. Stainless steel shelf with built-in deal tray and speak through.
  2. 30" width x 18" depth or as shown on drawings.
  3. ¼" tempered clear glazing.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

#### **3.02 PREPARATION**

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with manufacturer's instructions.

#### **3.03 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)**

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
  1. Place glazing tape on glazing pane of unit with tape flush with sight line.
- F. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.
- G. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- H. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

#### **3.04 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)**

- A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- E. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

### **3.05 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

**END OF SECTION**





**SECTION 09 21 16**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Acoustic insulation.
- C. Cementitious backing board.
- D. Gypsum wallboard.
- E. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- B. Section 06 10 00 – Rough Carpentry: Framing for walls, blocking/backing, other related work.
- C. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.
- D. Section 07 90 05 - Joint Sealers: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2012.
- B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- C. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.
- D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- E. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- F. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2007a (Reapproved 2011).
- G. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- H. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2014a.
- I. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.
- K. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- L. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- M. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.
- N. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2012.
- O. ICC (IBC) - International Building Code; 2012.
- P. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

## **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.

## **PART 2 PRODUCTS**

### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
  - 1. Fire Rated Partitions: UL listed assembly No. U419; 1 hour rating.
  - 2. Fire Rated Shaft Walls: UL listed assembly No. in compliance with local requirements.
  - 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

### **2.02 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 2. Lafarge North America Inc: [www.lafargenorthamerica.com](http://www.lafargenorthamerica.com).
  - 3. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - 4. USG Corporation: [www.usg.com](http://www.usg.com).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 3. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.
  - 4. Paper-Faced Products:
    - a. CertainTeed Corporation; ProRoc Brand Gypsum Board.
    - b. Lafarge North America Inc; Regular Drywall and Firecheck Type X and Type C.
    - c. National Gypsum Company; Gold Bond Brand Gypsum Wallboard.
    - d. USG Corporation; Sheetrock Brand Gypsum Panels.
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
  - 1. Application: Vertical surfaces behind thinset tile, except in wet areas.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 4. Type: Regular and Type X, in locations indicated.
  - 5. Type X Thickness: 5/8 inch.
  - 6. Regular Board Thickness: 5/8 inch.
  - 7. Edges: Tapered.
  - 8. Products:
    - a. CertainTeed Corporation; ProRoc Brand Moisture Resistant Gypsum Board ("Greenboard").

- b. Georgia-Pacific Gypsum; DensShield Tile Backer.
  - c. Lafarge North America Inc; Watercheck ("Greenboard").
  - d. National Gypsum Company; Gold Bond Brand XP Gypsum Board.
  - e. USG Corporation; Sheetrock Brand Mold Tough Gypsum Panels.
  - f. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Backing Board For Wet Areas:
- 1. Application: Surfaces behind tile, FRP, or Culter Marble Wall Panels, in wet areas and elsewhere as indicated on drawings.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    - a. Thickness: Nominal ½ inch.
    - b. Products: Custom Building Products; WonderBoard Lite: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle), or approved equal.

### 2.03 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
  - 1. Owens Corning - Noise Barrier Batts
  - 2. Manville - Sound Control Batts
  - 3. Certainteed - Sound Control Batts
  - 4. Guardian Fiberglass, Inc. - Sound Control Batts
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board. Acoustical sealant shall be as manufactured by one of the following or approved equal:
  - 1. Ohio Sealants Inc. - Sound Sealant Rubber Base
  - 2. Pecora - Acoustical Sealant
  - 3. Tremco -Acoustical Sealant
- D. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
  - 1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
  - 2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
  - 3. Ready-mixed vinyl-based joint compound.
  - 4. Powder-type vinyl-based joint compound.
  - 5. Chemical hardening type compound for use in mold resistant systems.
  - 6. Rip Bead and related for areas as required: Clarkdietrich or approved equal.
- E. Screws for Attachment to Steel Members Less Than 0.033 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium plated for exterior locations.
- F. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.
- G. Z-Channels: Manufacturer to be Armatherm Z Grit.
- H. Hat Channels: Manufacturer to be Cemco Steel.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

### **3.03 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
  - 1. Place one bead continuously on substrate before installation of perimeter framing members.
  - 2. Place continuous bead at perimeter of each layer of gypsum board.
  - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.
  - 4. Bottom of Partitions: Apply a round bead of sealant at each side stud track before setting gypsum board. Set gypsum board into sealant to form complete contact with adjacent materials.
  - 5. Top and Sides of Partitions Abutting Existing Construction or Non-acoustical New Construction - After gypsum board is installed apply acoustical sealant to provide full contact with adjacent existing surfaces at each side of the partition.
  - 6. Cut Outs - Backs of electrical boxes, pipes, ducts, and other equipment penetrating the wall surface shall be buttered with sealant and perimeter edges of all items sealed with sealant.

### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- E. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

### **3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
  - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
  - 2. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
  - 3. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
  - 4. Construction changes within the plane of partition or ceiling.
  - 5. Ceiling dimensions exceed fifty feet in either direction with perimeter relief, thirty feet without relief.
  - 6. Where wings of "L", "U" and "T" shaped ceiling areas are joined.
  - 7. Where gypsum board systems abut dissimilar materials, gypsum board shall be isolated by installing a casing bead within a 1/4" of the dissimilar material and sealing the joint with either acoustical sealant as specified above for sound insulated partitions or caulking as specified under Section 07 90 05.
  - 8. Ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners. Window openings shall be treated similar to doors with joint extending to the floor as well as the ceiling. Control joints in gypsum board to gypsum board configurations shall be formed using expansion joint formers as specified above. Joints shall be caulked with sound sealant or caulking as specified in Section 07 90 05 as appropriate to the condition.

9. Control joints in fire rated construction shall be formed with double studs and expansion joint former and backed with safing insulation as specified under Section 07 84 00.

B. Corner Beads: Install at external corners, using longest practical lengths.

### **3.06 JOINT TREATMENT**

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

**END OF SECTION**



## **SECTION 09 30 00 TILING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Ceramic accessories.
- D. Cementitious backer board as tile substrate.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

#### **1.03 REFERENCE STANDARDS**

- A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2019.
  - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017.
  - 2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 2017.
  - 3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement (reaffirmed 20176).
  - 4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2012.1.
  - 5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2012.1.
  - 6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 2012.1.
  - 7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 2012.1.
  - 8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 2012.1.
  - 9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2012.1.
  - 10. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2012.1.
  - 11. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior glue plywood) Latex-Portland Cement Mortar; 2012.1.
  - 12. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2012.1.
- B. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2019.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Product Data: Provide instructions for using grouts and adhesives.
- D. Samples: Provide (1) physical sample of each Specified Tile to architect for review.
- E. Verification from the flooring installer, in writing, on his letterhead, indicating that he has reviewed the concrete moisture content testing reports, or has conducted his own moisture content tests and accepts the moisture levels present within the concrete slab as acceptable for the installation of the products being furnished.

- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

### **1.06 FIELD CONDITIONS**

- A. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.
- B. Do not install solvent-based products in an unventilated environment.

## **PART 2 PRODUCTS**

### **2.01 TILE**

- A. ANSI A137.1, standard grade.
- B. Floor Tile, Non-bathroom locations: Virginia Tile Marazzi Moroccan Concrete 12" x 24" Matte Finish
  - 1. Color: TBD
  - 2. Base: Provide matching 3" x 24" bullnose trim for base.
- C. Floor Tile, Bathrooms: Virginia Tile Ceasar USA Run 2" x 2" Mosaic Matte Finish,
  - 1. Color: TBD
- D. Wall Tile, Bathrooms: Virginia Tile Ceasar USA Run Rectified 12" x 24" Matte Finish
  - 1. Color: TBD
  - 2. Install method: Standard grid with 24" length running vertically.
  - 3. Cove base with wall tile: use full size wall tile with metal cove trim as detailed below.

### **2.02 TRIM AND ACCESSORIES**

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
  - a. General Applications:
    - 1) Open edges of floor tile: Schluter SCHIENE
    - 2) Wall corners, outside: Schluter SCHIENE
    - 3) Transition between floor finishes of different heights: Profile as recommended.
    - 4) Thresholds at door openings: Profile as recommended.
    - 5) Expansion and control joints, floor and wall.
    - 6) Floor to wall joints: Schullter DILEX-AHK cove trim.
  - 2. Manufacturers:
    - a. Schluter-Systems: [www.schluter.com](http://www.schluter.com).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.03 SETTING MATERIALS**

- A. Provide setting materials made by the same manufacturer as grout.
- B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
  - 1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
  - 2. Products:
    - a. ARDEX Engineered Cements; ARDEX X 77  
MICROTEC: [www.ardexamericas.com](http://www.ardexamericas.com).
    - b. LATICRETE International, Inc.; 253 Gold: [www.laticrete.com](http://www.laticrete.com).
    - c. Merkrete, by Parex USA, Inc; Merkrete 7D10 Dust Less Thin Set: [www.merkrete.com](http://www.merkrete.com).
    - d. ProSpec, an Oldcastle brand; PermaFlex 300: [www.prospec.com](http://www.prospec.com).
    - e. TEC, Full Flex, [www.NStile.com](http://www.NStile.com).
    - f. Bostik, Tile-mate Floor & Wall, [www.bostik-us.com](http://www.bostik-us.com).
    - g. Substitutions: See Section 01 60 00 - Product Requirements.



## 2.04 MORTAR MATERIALS

- A. Manufacturers:
  - 1. Bonsal American, Inc.; Product Multi-Purpose thin-set mortar with B-730: [www.sakrete.com](http://www.sakrete.com)
  - 2. Bostik, Inc; Product Hydroment Tile-Mate thin-set mortar with Multipurpose Acrylic Latex Additive: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Custom Building Products; Product VersaBond Bonding Mortar: [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
  - 4. Mapei; Product Ultra/Flex 1.
  - 5. Laticrete; Product 272 Premium Floor N'Wall Thin Set Mortar.
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.05 WATERPROOFING MATERIALS

- A. Setting/Waterproofing Membrane: Trowel applied Urethane complying with ANSI A136.1
  - 1. Waterproofing membrane shall meet the requirements of ASTM C836-84 (Elastomeric Waterproofing Membrane Specification).
  - 2. Waterproofing membrane shall comply with CTI-64-2 standards.
  - 3. Plans and specifications are based on Bostik: Hydroment Ultra-Set.
  - 4. Use Hydroment Prime Coat for surfaces not covered within 72 hours of application.
  - 5. Substitutions see Section 01600 - Product Requirements.
- B. Vinyl Shower Pan Liner: Meet or exceed ASTM D 4551-86b, 100% Virgin Poly Vinyl Chloride Resin, treated with biocides to prevent mold, mildew or fungus growth. Membrane shall be unaffected by concrete or cement.
  - 1. Pasco Specialty Manufacturing, Inc.: Red 40 mil thick. Phone 800-421-2053.
  - 2. Dal Tile: Chloraloy; Phone 800-933-8453.
  - 3. Substitutions see Section 01 60 00 - Product Requirements.
- C. Waterproof Membrane: Self-adhering, two component, 40 mil membrane. The reinforced fiber sheet shall be laminated to a polymer modified elastomeric base sheet which is capable of extra heavy duty service as per ASTM C627. Joints shall be 2 inch overlapping self-sealing design to form a watertight seal. Waterproof membrane shall be Strataflex Thin Bed Waterproofing Membrane as manufactured by National Applied Construction Products, Inc. (216) 928-3414.
  - 1. Substitutions see Section 01 60 00 - Product Requirements.
- D. Furnish all primers, seam and corner tapes, sealants and leveling compounds as required for a complete installation of Waterproof Membrane systems.

## 2.06 GROUTS

- A. Manufacturers:
  - 1. Bonsal American, Inc.; Product Polymer Modified Sanded Tile Grout & Epox-E-Set: [www.sakrete.com](http://www.sakrete.com)
  - 2. Bostik Inc; Product Ceramic Tile Grout (Sanded) & Color-Poxy: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Custom Building Products; Product Polyblend Sanded Tile Grout & 100% Solids Epoxy Grout: [www.custombuildingproducts.com](http://www.custombuildingproducts.com).
  - 4. Mapei; Product KER 200 Series (Sanded) & Kerapoxy.
  - 5. Laticrete; Product: Laticrete Sanded Grout 500 Series & Latapoxy SP-100.
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Standard Grout: Standard sanded cement grout, as specified in ANSI A118.6.

## 2.07 THIN-SET ACCESSORY MATERIALS

- A. Cleavage Membrane: Polymer modified elastomer laminated to a "stress flex" fiber sheet to form a single 40 mil high strength self-bonding membrane. Cleavage Membrane shall be as manufactured by one of the following or approved equal:
  - 1. National Applied Construction Products, Inc.: ECB Membrane; Phone (216) 928-3414.
- B. Anti-Fracture Membrane: 40 mil thick reinforced peel-n-stick sheet membrane with a rubberized adhesive that aggressively sticks to the substrate and will not dry out. Fabric reinforcement is laminated to the top of the membrane.
  - 1. Protecto Wrap Company: AFM Anti Fracture Membrane; Phone 800-759-9727.

2. Protecto Wrap Company: AFM-WM Waterproofing Membrane, same construction as above with a 2 inch wide overlap adhesive strip; Phone 800-759-9727.
  3. Laticrete International, Inc.: Laticrete Crack Isolation Mat (55 mil); Phone 800-243-4788.
- C. Waterproofing Crack Isolation Membrane for Thinset Applications: 30 mil plasticized PVC shower pan liner sandwiched between two layers of 2.5 mil thick non-woven spunbonded polyester fibers, for bonding to wood, metal or concrete subfloors.
1. Pasco Specialty Manufacturing, Inc.: BaseLine. Phone 800-421-2053.
  2. Dal Tile: Dal-Seal TS, DAI-Seal CIS or Noble Deck 40 mil, Dal-Sound 50 mil (Sound Isolation); Phone 800-933-8453.
- D. Furnish all primers, seam and corner tapes, sealants and leveling compounds as required for a complete installation of Waterproof Membrane systems.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.
- B. Verify that concrete sub-floor surfaces are ready for tile installation by reviewing testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft (7.1 kg per 100 sq m) per 24 hours when tested using calcium chloride moisture test kit for 72 hours as per ASTM F 1869-03, or slab humidity levels as measured by in situ Probes of 75% relative humidity or less as measured per ASTM F2170.
  2. Alkalinity: pH range of 5-9.
  3. Installer shall verify in writing that he has reviewed the test results and is satisfied that the installation can proceed.

### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Wood Floor Preparation (all areas):
1. In general, install floor tile system to meet the requirements of TCA F144, and the manufacturers of the cementitious backer board, tile and mortar.
  2. Apply a full bond coat of portland cement mortar over the thoroughly cleaned plywood sheathing using a 1/4 x 1/4 inch square notched trowel.
  3. Onto the mortar bed lay a layer of 1/2 inch cementitious backer board holding the manufacturer's recommended spacings. Screw anchor to the plywood sheathing as follows:
    - a. Perimeter edges and penetrations: 3 inches on center, one (1) inch from edge of board.
    - b. Field: 8 inches on center in both directions.
  4. Fill joints with mortar and trowel flush.
  5. After mortar has set for twenty four hours, sand joints and screw dimples flush with adjacent.
- E. Cleavage Membrane Application over cementitious board all areas:
1. Apply primer to substrate as described below.
  2. Install Cleavage Membrane in accordance with manufacturer's instructions over the entire wood floor area that is to receive ceramic tile.
  3. Cleavage membrane joints shall be tightly butted, do not overlap.
- F. Waterproof Membrane Application:
1. Primer Application:
    - a. Substrate temperature should be above 45 degrees F when applying primer and membrane.

- b. Damp mop substrate prior to application.
  - c. Keep area well ventilated.
  - d. Primer shall be stirred thoroughly before applying.
  - e. Use a roller, brush squeegee or other suitable method to apply. Apply an even coat to the substrate and let dry to a tacky touch. When prime doesn't transfer to your finger, it is ready for membrane application.
2. Membrane Application:
- a. Membrane placement should start at the low end of the area to achieve a shingled effect.
  - b. The salvage edge (2 inch section without fabric) should be on the side to be covered by the next roll.
  - c. Directional alignment is critical and placement of the membrane will be made easier by the following procedure:
    - 1) Position the membrane over the area to be treated. Unroll the membrane to establish direction and length with the white release sheet still attached. Cut to size leaving 2 to 4 inch overlap at each end.
    - 2) Roll up 1/2 of the membrane leaving the other half unrolled. Place yourself on the side where the membrane was rolled-up. Cut the white release sheet from the rolled up portion of the membrane and pull it towards you, exposing and unrolling the black self-bonding portion of the membrane. Make certain of the membrane position and carefully pull off the release paper. Roll up the second half of the membrane and follow the same procedure.
    - 3) Make certain of the membrane position and smooth out wrinkles and air pockets with the flat side of a trowel. Roll with a 75-100 lb. roller to insure positive contact with the substrate.
  - d. When placing the next roll, it should be positioned to over the leading edge of the previous roll. The leading edge is self-sealing and requires only to be pressed into firm contact with the flat side of the trowel or roller after the white release paper is peeled off. The leading edge serves as a guide to obtain an even overlap and to avoid waste. Follow the same procedures as noted above for membrane placement.
  - e. End seams may be overlapped 2 inches or double-cut. End seams and all daily terminations must be coated 1/8 inch thick x 1 inch wide with urethane sealant. Let the sealant cure overnight before applying tile.
3. Corner and Wall Treatment:
- a. Turn the membrane up the wall to the height of the tile base. When paralleling a wall in the direction of the roll, pre-measure and cut the membrane to the desired length.
  - b. Position the membrane with the desired amount of up-turn and crease the membrane to provide a tight corner.
  - c. With the membrane in place, fold the membrane in half lengthwise so it faces the wall. Carefully cut the white release paper at the fold.
  - d. Position yourself facing the wall and grab the cut portion of the white paper and pull it towards you exposing and unrolling the black portion of the membrane.
  - e. Follow the same procedure with the other half of the membrane in the opposite direction.
  - f. Carefully crease the membrane at the wall with the flat side of the trowel.
  - g. Corners may be folded or cut. Seal all cuts with Urethane sealant. Let sealant cure overnight.
4. Drains and Protrusions:
- a. Apply Membrane around drains and place a 1/8 inch thick x 1 inch wide bead of Urethane sealant between the membrane and the clamping ring. Let sealant cure overnight.
  - b. An alternate method for drains and protrusions is to apply Urethane sealant or equal, around the drain or protrusion and overlap membrane a minimum of 2 inches. Sealant should be applied vertically on protrusions to a height of 6 inches, or to the height of the water line.

- c. Floor installation: Key the setting material into the membrane with the flat side of the trowel. Reapply mortar with the notched side as recommended by the mortar manufacturer. A 1/4 x 3/8 inch trowel is recommended. Cure the setting mortar 72 hours before grouting.

### **3.03 INSTALLATION - GENERAL**

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.
- B. Request tile pattern. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install ceramic accessories rigidly in prepared openings.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- I. Grout tile joints. Use standard grout unless otherwise indicated.
- J. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- K. At entry, install quarry tile as shown on drawings to provide a recess for the entry mat. At the nearest mortar joint to each corner of the recess, in either the East/West or North/South direction provide a caulked control joint from the recess to the wall in each direction.

### **3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, dry-set or latex-portland cement bond coat, with standard grout, unless otherwise indicated.

### **3.05 INSTALLATION - WALL TILE**

- A. Over interior concrete and masonry install in accordance with The Tile Council of North America Handbook Method W202, thin-set with dry-set or latex-portland cement bond coat.
- B. Install wall tile to pattern shown on drawings.

### **3.06 CLEANING**

- A. Clean tile and grout surfaces.

**END OF SECTION**

**SECTION 09 51 00  
SUSPENDED ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- B. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

**1.03 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.

**1.06 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.07 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**PART 2 PRODUCTS**

**2.01 ACOUSTICAL UNITS**

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
- C. SACT-1:
  - 1. USG Mars # 86185HRC 2'x2'
  - 2. Series: Mars Acoustical Panels
  - 3. Size: 2'x2'
  - 4. Acoustics: 0.75 NRC
  - 5. Fire Performance Class A
  - 6. Color: White

- D. ACT-2:
1. Donn Band DXW 1-1/2" Acoustical Suspension System
  2. Series:
  3. Size: 2'x2'
  4. Acoustics:
  5. Fire Performance Class A
  6. Color: Flat Black 205

## **2.02 SUSPENSION SYSTEM(S)**

- A. Manufacturers:
1. Same as for acoustical units.
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
1. Profile: Tee; 15/16 inch wide face.
  2. Construction: Double web.
  3. Finish: White painted.

## **2.03 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Wood Veneer Panel Safety Clips: Galvanized 1-9/16 by 5-1/2 inch bent sheet metal clips screw anchored to back of adjacent panels and spanning over top of suspended tee grid.
1. Wire Ties: No. 12 galvanized wire.
- C. Perimeter Moldings: Same material and finish as grid.
1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- D. Furnish and install ceiling hold down clips for all lay-in ceilings that are installed in Vestibules or within twenty feet of an exterior door.
- E. Ceiling holddown clips.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.

- H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.

### **3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**





**SECTION 09 65 00  
RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

**1.03 REFERENCE STANDARDS**

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2019, with Editorial Revision (2020).
- B. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading 2017.
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile 2004 (Reapproved 2018).
- D. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing 2004 (Reapproved 2014).
- E. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile 2020.
- F. ASTM F1861 - Standard Specification for Resilient Wall Base 2016.
- G. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing 2019.
- H. ASTM F2169 - Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, minimum 6 inch x 6 inch in size illustrating color and pattern for each resilient flooring product specified.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect roll materials from damage by storing on end.

**1.07 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

## **PART 2 PRODUCTS**

### **2.01 TILE FLOORING**

- A. Luxury Vinyl Tile (LVT): ASTM F1700 Class III, Type B; 0.1575" total thickness, with 20 mil wear layer; micro bevel edge; 7.25" x 48" size.
  - 1. Manufacturers:
    - a. Mannington No Reservations Express Wood; Color TBD
    - b. Substitutions: See Section 01 60 00 – Product Requirements

### **2.02 RESILIENT BASE**

- A. Resilient Base - ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
  - 1. Manufacturers:
    - a. Burke Flooring; Commercial Wall Base - TS: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - c. Roppe Corp: [www.roppe.com/#sle](http://www.roppe.com/#sle).
    - d. VPI.
    - e. Armstrong
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Height: 4 inch.
  - 3. Thickness: 0.125 inch.
  - 4. Finish: Satin.
  - 5. Accessories: Premolded external corners and internal corners.

### **2.03 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Metal.
- D. Filler for Coved Base: Plastic.
- E. Cap for Sheet Vinyl Coved Base: Vinyl
- F. Sealer and Wax: Types recommended by flooring manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is fully cured.
- C. Clean substrate.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.

- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- J. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- K. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- L. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Before installation of flooring, secure metal strips with stainless steel screws.
- M. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

#### **3.04 INSTALLATION - RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Scribe and fit to door frames and other interruptions.

#### **3.05 INSTALLATION - STAIR COVERINGS**

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Adhere over entire surface. Fit accurately and securely.

#### **3.06 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.
- C. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

**END OF SECTION**



**SECTION 09 65 73**  
**WOOD COMPOSITE DECKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This Section specifies slip, fade, stain, scratch, mold and mildew resistant composite wood decking and accessories approved for direct ground and water content.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00: Rough Carpentry – Related work.

**1.03 REFERENCE STANDARDS**

- A. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM D143 Standard Test Methods for Small Clear Specimens of Timber.
- C. ASTM D648 Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
- D. ASTM D1037 Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
- E. ASTM D1525 Standard Test Method for Vicat Softening Temperature of Plastics.
- F. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- G. ASTM D1761 Standard Test Methods for Mechanical Fasteners in Wood.
- H. ASTM D1929 Standard Test Method for Determining Ignition Temperature of Plastics.
- I. ASTM D2394 Standard Test Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring.
- J. ASTM D6109 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products.
- K. ASTM D7032 Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite and Plastic Lumber Deck Boards, Stair Treads, Guards, and Handrails.
- L. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.
- C. Shop Drawings: Indicate deck framing system, loads and cambers, bearing details, and framed openings.
- D. Samples of Wood Deck Exposed To View: Submit two samples, illustrating texture, colors and profile, size and applicable finishes.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience and certified.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Supplier shall retain and store material under a permanent roof that will prevent damage due to weather until needed at the job site.
- B. General Contractor shall be responsible for protection of the material after arrival at the job site.
- C. Use non-marring slings for loading, unloading and handling decking to minimize damage to surfaces and/or wrapping.
- D. Unload at site, place on adequate level supports off ground, protected from the elements.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Advanced Environmental Recycling Technologies, Inc; 914 N Jefferson, Springdale, AR 72764; Phone: (866) 729-2378, (479) 756-7400; Fax: (479) 756-7410; Email: info@moistureshield.com; Website: www.moistureshield.com
  - 1. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 WOOD MATERIALS**

- A. Comply with ICC-ES Report ESR-2388.
- B. Composite Wood Decking: To ASTM D7032 and ASTM D1037.
- C. Thermal Transmission: To ASTM C518.
- D. Surface Burning Characteristics: To ASTM E84 Class C or Class III.
  - 1. Flame spread: 100.
  - 2. Smoke Developed: 350.
- E. Ignition Characteristics: To ASTM D1929
  - 1. Self Ignition: 741 degrees F.
  - 2. Flash ignition: 729 degrees F.
- F. Insect Resistance: To AWPA E1.
- G. Comply with Federal Manufactured Home Construction and Safety Standards.
- H. Flexural Properties: To ASTM D648 and ASTM D6109.
- I. Hardness: To ASTM D143.
- J. Abrasion Resistance: To ASTM D2394.
- K. Compressive Strength: To ASTM D1621, 962 psi.
- L. Heat Softening: Comply with ASTM D1525.
- M. Slip, fade, stain, scratch, mold and mildew resistant composite wood decking with high recycled content and approved for direct ground and water contact.
- N. Decking: Reclaimed wood and polyethylene plastic with additives for coloring and inhibiting fungal and algal growth; free from toxic chemicals.
  - 1. Profiles:
    - a. Deck board: 2 × 6 inches × [12] [16] [20] feet long [with grooves for concealed fastening].
    - b. Fascia Trim Board: 0.67 × 11.25 × 12 feet long.
- N. Colors: Architect to choose color from standard selection.

### **2.03 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Fastener Type and Finish: Hot-dipped galvanized steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Hidden Fasteners: [Coated steel] [Stainless Steel] deck clips capable of supporting deck boards above joists.
    - a. Acceptable material: MoistureShield Deck Clips

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that support framing is ready to receive decking.

### **3.02 PREPARATION**

- A. Coordinate placement of bearing items.

### **3.03 INSTALLATION - BOARD DECKING**

- A. Install decking perpendicular to framing members, with ends staggered over firm bearing. On sloped surfaces, lay decking with tongue upward.
- B. Install decking in a Random Length Continuous lay-up.
  - 1. Random length continuous lay-up shall be applied over three or more spans.
  - 2. Each individual plank must bear on at least one supporting member.
  - 3. All joints shall be end matched and all planks shall be nailed together within one foot of each side of the end joint.
  - 4. End joints in adjacent planks shall be at least 2 feet apart, and end joints in alternate planks shall be more than one foot apart when measured along the span of the decking.
  - 5. Eliminate end joints in 1/3 of the end span course.
- C. Engage decking edges.
- D. Install per manufacturers installation instructions.

**END OF SECTION**





**SECTION 09 68 13  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

**1.02 RELATED REQUIREMENTS**

**1.03 REFERENCE STANDARDS**

- A. CRI (GLP) - Green Label Plus Testing Program - Certified Products Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

**1.06 FIELD CONDITIONS**

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Tile Carpeting:
  - 1. Mannington
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Tile Carpeting: Tufted Textured Patterned Loop, manufactured in one color dye lot.
  - 1. CPT: Mannington Blueprint Sketch; Color TBD
    - a. Tile Size: 24 by 24 inch, nominal.
    - b. 100% Type 6 Nylon; Solution dyed.
    - c. Weight: 14 oz/yd sq
    - d. Backing: Infinity 2 Modular
    - e. VOC Content: Comply with Section 01 61 16; CRI Green Label Plus Certified.
    - f. VOC Content: Provide CRI (GLP) certified product; in lieu of labeling, independent test report showing compliance is acceptable.

**2.03 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Embossed aluminum.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

### **3.02 PREPARATION**

- A. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- B. Vacuum clean substrate.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Fully adhere carpet tile to substrate.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

### **3.04 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**

**SECTION 09 90 00**  
**PAINTING AND COATING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished
- D. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Floors, unless specifically so indicated.
  - 6. Ceramic and other tiles.
  - 7. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 8. Exterior insulation and finish system (EIFS).
  - 9. Glass.
  - 10. Concealed pipes, ducts, and conduits.

**1.02 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- C. GreenSeal GS-11 - Paints; 1993.
- D. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings; Fourth Edition.
- E. SSPC (PM2) - Steel Structures Painting Manual, Vol. 2, Systems and Specifications; Society for Protective Coatings; 1995, Seventh Edition.

**1.03 DEFINITIONS**

- A. Conform to ASTM D 16 for interpretation of terms used in this section.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "drop" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
- D. Product Data: Provide data on all finishing products, including VOC content.
- E. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on gypsum board.

- F. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Coatings: 1 gallon (4 L) of each color; store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

### **1.06 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints: Provide Zero VOC latex paints for each manufacturer.
  - 1. Base Manufacturer: Sherwin Williams (SW) - ProMar 200 Zero - VOC Mixture.
  - 2. Glidden Professional: [www.gliddenprofessional.com](http://www.gliddenprofessional.com).
  - 3. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 4. Pittsburgh Paints
  - 5. Pratt & Lambert.
  - 6. Diamond Vogel
- C. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 PAINTS AND COATINGS - GENERAL**

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
  - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
  - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
  - 1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; [www.otcair.org](http://www.otcair.org); specifically:
      - 1) Opaque, Flat: 50 g/L, maximum.
      - 2) Opaque, Non-flat: 150 g/L, maximum.
      - 3) Opaque, High Gloss: 250 g/L, maximum.
      - 4) Varnishes: 350 g/L, maximum.
    - c. Architectural coatings VOC limits of State in which the project is located.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Chemical Content: The following compounds are prohibited:
  - 1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  - 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.
- E. Flammability: Comply with applicable code for surface burning characteristics.
- F. Colors: To be selected from manufacturer's full range of available colors.
  - 1. Selection to be made by Architect after award of contract.

### **2.03 PAINT SYSTEMS - EXTERIOR**

- A. Paint ME-OP-2L - Exterior Ferrous Metals, Primed, Latex, 2 Coat:
  - 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
  - 2. Semi-gloss: Two coats of latex enamel; SW DMT Acrylic Semi-gloss Coating.

### **2.04 PAINT SYSTEMS - INTERIOR**

- A. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat.
  - 1. Touch-up with latex primer.
  - 2. Semi-gloss: Two coats of latex enamel; SW DMT Acrylic Satin Coating B66-2100.
- B. Paint GI-OP-3L - Gypsum Board/Plaster, Latex-Acrylic, 3 Coat, WALLS:
  - 1. One coat of Latex primer sealer, SW ProMar 200 Latex Primer.
  - 2. Eggshell: Two coats of latex enamel; SW ProMar 200 Latex Eggshell.
- C. Paint GI-OP-3LA - Gypsum Board/Plaster, Latex-Acrylic, 3 Coat, CEILINGS:
  - 1. One coat of Latex primer sealer, SW ProMar 200 Latex Primer.
  - 2. Flat: Two coats of latex enamel-acrylic; SW ProMar 200 Latex Flat.
- D. Paint GI-OP-3EP - Gypsum Board/Plaster, Epoxy, 3 Coat, WALLS & CEILINGS.
  - 1. One coat of SW Waterbased Tile-Clad Primer.
  - 2. Two coats of water based epoxy SW Epo-Plex Multi-Mil Water Based Epoxy (B71-100 Series).

### **2.06 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.
  - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- H. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- J. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Sand wood and metal surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.05 SCHEDULE - SURFACES TO BE FINISHED**

- A. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically noted.
  - 2. Fire rating labels, equipment serial number and capacity labels.
- B. Paint the surfaces described below under Schedule - Paint Systems.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
  - 1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
  - 2. Paint shop-primed items occurring in finished areas.
  - 3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
  - 4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

### **3.06 SCHEDULE - PAINT SYSTEMS**

- A. Gypsum Board: Finish all surfaces exposed to view.
  - 1. Interior Ceilings and Bulkheads: GI-OP-3L, flat.
  - 2. Interior Walls: GI-OP-3L, Eggshell.
  - 3. Interior Walls and Ceilings: GI-OP-3EP, epoxy as scheduled.
- B. Steel Frames: Finish all surfaces exposed to view; MI-OP-2L, satin.
- C. Steel Fabrications: Finish all surfaces exposed to view.
  - 1. Exterior: ME-OP-2L, semi-gloss; finish all surfaces, including concealed surfaces, before installation.
  - 2. Interior: MI-OP-2L, satin.
- D. Exterior materials to be pre-finished from manufacturer(s).

### **3.07 SCHEDULE - COLORS**

- A. Paint color locations notated on Room Finish Schedule. Colors to match the following:
  - 1. PT-1: TBD

**END OF SECTION**





**SECTION 10 14 23**  
**SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Signage.

**1.02 REFERENCES**

- A. ANSI/ICC A117.1 - Accessible and Useable Buildings and Facilities; 2003.
- B. ATBCB ADAAG - Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG); U.S. Architectural Transportation Barriers Compliance Board; 2004.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature.
- C. Shop Drawings: List sign styles, lettering, locations and dimensions of each interior sign.
- D. Selection Samples: One complete set of color chips representing manufacturer's full range of available colors.
- E. Verification Samples: Two full size samples, representing type, style and color specified including method of attachment.

**1.04 QUALITY ASSURANCE**

- A. Regulatory Requirements: Comply with requirements of ANSI/ICC A117.1 and ADAAG.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Inspect products upon receipt. Store products in manufacturer's packaging until ready for installation.

**1.06 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

**1.07 INFORMATION**

- A. Work scope includes:
  - 1. ADA compliant room identification signage.
- B. Door Signs, Typical:
  - 1. One-piece unframed rigid vinyl construction
  - 2. Contrasting partial inlay raised ADA compliant tactile lettering, permanently affixed to the backplate and Grade II ADA compliant Braille.
  - 3. ADA compliant tactile lettering.
  - 4. Size: 6"H x 8"W
  - 5. Provide quantity of (30)
  - 6. Provide up to (4) matching backplates for sign locations installed on glazing.
- C. Door Signs, Office:
  - 1. One-piece unframed rigid vinyl construction.
  - 2. Contrasting partial inlay raised ADA compliant tactile lettering, permanently affixed to the backplate and Grade II ADA compliant Braille.
  - 3. ADA compliant tactile lettering.
  - 4. Size: 8"H x 8"W
  - 5. Provide paper insert strip with clear facing.
  - 6. Provide quantity of (12)
  - 7. Provide up to (3) matching backplates for sign locations installed on glazing.
- D. Door Signs, Restroom:
  - 1. One-piece unframed rigid vinyl construction.

2. Contrasting partial inlay raised ADA compliant tactile lettering, permanently affixed to the backplate and Grade II ADA compliant Braille.
3. ADA compliant tactile lettering.
4. Size: 8"H x 8"W
5. Provide quantity of (4)
6. Include international symbols of accessibility and male/female symbols as determined.

## **PART 2 PRODUCTS**

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine installation areas to ensure that conditions are suitable for installation.
- B. Examine signage for defects prior to installation. Do not install damaged signage.

### **3.02 PREPARATION**

- A. Verify mounting heights and locations for interior signage will comply with referenced standards.
- B. Clean mounting locations of dirt, dust, grease or similar conditions that would prevent proper installation.

### **3.03 INSTALLATION**

- A. Install signs level, plumb, without distortion, and in proper relationship with adjacent surfaces using manufacturer's recommended standard mounting system.
  1. Mounting: Mount as per manufacturer's recommendations.
- B. Remove adhesive from exposed sign surfaces as recommended by manufacturer.
- C. Clean signs after installation as recommended by manufacturer.
- D. Replace damaged products before Substantial Completion.

**END OF SECTION**

**SECTION 10 26 01  
CORNER GUARDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Corner guards.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Wall and Corner Guards:
  - 1. Babcock-Davis: [www.babcockdavis.com](http://www.babcockdavis.com).
  - 2. Construction Specialties, Inc: [www.c-sgroup.com](http://www.c-sgroup.com).
  - 3. Inpro: [www.inprocorp.com](http://www.inprocorp.com).
  - 4. Nystrom, Inc: [www.nystrom.com](http://www.nystrom.com).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 COMPONENTS**

- A. Corner Guards - Surface Mounted: Extruded rigid vinyl, one-piece unit without splices, installed with adhesive.
  - 1. Inpro Corporation Tape-on corner guards
    - a. Color: As selected from manufacturer's standard colors
    - b. 3/4" wing size, 4' height or as shown on drawings, installed above wall base
    - c. Provide quantity of (24); Required locations TBD in the field.

**2.03 FABRICATION**

- A. Fabricate components with tight joints, corners and seams.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that field measurements are as indicated on Drawings.

**3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard recommended inches above finished floor to recommended inches high.

**END OF SECTION**



**SECTION 10 28 00**  
**TOILET, BATH, AND UTILITY ROOM ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Accessories for toilet rooms, showers, and utility rooms.
- B. Grab bars.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 30 00 - Tiling: Ceramic washroom accessories.
- B. Section 10 21 13.16 - Plastic-Laminate-Clad Toilet Compartments.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.
- B. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2010.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.
- E. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2011e1.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2011e1.
- G. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008.
- H. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004 (Reapproved 2010).
- I. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Products listed are made by Bobrick.
- B. Other Acceptable Manufacturers:
  - 1. A & J Washroom Accessories Inc: [www.ajwashroom.com](http://www.ajwashroom.com).
  - 2. American Specialties, Inc: [www.americanspecialties.com](http://www.americanspecialties.com).
  - 3. Bradley Corporation: [www.bradleycorp.com](http://www.bradleycorp.com).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

- B. Keys: Provide 2 keys for each accessory to Owner; master key all lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, Type 304 or 316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Mirror Glass: Float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Adhesive: Contact type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

### **2.03 FINISHES**

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.
- E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- F. Back paint components where contact is made with building finishes to prevent electrolysis.

### **2.04 TOILET ROOM ACCESSORIES**

- A. Toilet Paper Dispenser: Double roll, surface mounted bracket type, satin finished cast aluminum brackets, eccentric-shaped plastic spindle for 1/2 revolution delivery designed to prevent theft of tissue roll.
  - 1. Product: B-2740 manufactured by Bobrick.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, semi-recessed, with viewing slots on sides as refill indicator and tumbler lock.
  - 1. Capacity: 400-C Fold minimum.
  - 2. Product: B-262 manufactured by Bobrick.
- C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator, tumbler lock.
  - 1. Minimum Capacity: 40 ounces.
  - 2. Product: B-2112 manufactured by Bobrick.
- D. Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
  - 1. Size: As shown on drawings.
  - 2. Frame: 1-2 inch channel shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
  - 3. Backing: Full-mirror sized, minimum 0.03 inch (0.8 mm) galvanized steel sheet and non-absorptive filler material.
  - 4. Product: B-165 standard sizes as noted on drawings manufactured by Bobrick.
- E. Grab Bars: Stainless steel, 1-1/2 inches (38 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches (38 mm) clearance between wall and inside of grab bar.
  - 1. Length and configuration: As indicated on drawings.
  - 2. Product: B-6806 manufactured by Bobrick.

## **2.05 SHOWER AND TUB ACCESSORIES**

- A. Shower Curtain Rod: Stainless steel tube, 1 inch (25 mm) outside diameter, 0.04 inch (1.0 mm) wall thickness, satin-finished, with 3 inch (75 mm) outside diameter, minimum 0.04 inch (1.0 mm) thick satin-finished stainless steel flanges, for installation with exposed fasteners.
  - 1. Product: B-6107 manufactured by Bobrick.
- B. Shower Curtain:
  - 1. Material: Opaque vinyl, 0.008 inch (0.2 mm) thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
  - 2. Material: Vinyl, machine washable, and mildew-resistant.
  - 3. Grommets: Nickel-Plated Brass; pierced through top hem on 6 inch (150 mm) centers.
  - 4. Color: White.
  - 5. Shower curtain hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
  - 6. Product: Curtain 204-3; Hooks 204-1 manufactured by Bobrick.
- C. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, L-shaped, right-hand seat.
  - 1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected.
  - 2. Size: ADA compliant.
  - 3. Product: B-5181 manufactured by Bobrick.
- D. Robe Hook:
  - 1. Product: American Standard Studio S Double Robe Hook, Polished Chrome, Model No. 7105.210.002
  - 2. Location/Quantity: Provide (2) robe hooks for each new shower room. Exact locations to be determined during construction.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

### **3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

### **3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: As required by accessibility regulations, as indicated on drawings.

### **3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**





**SECTION 10 44 00**  
**FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

**1.02 REFERENCE STANDARDS**

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Conform to NFPA 10.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguisher Cabinets and Accessories:
  - 1. JL Industries, Inc: [www.jlindustries.com](http://www.jlindustries.com).
  - 2. Larsen's Manufacturing Co: [www.larsensmfg.com](http://www.larsensmfg.com).
  - 3. Nystom
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Dry Chemical Type Fire Extinguishers: Cast steel tank, with pressure gage.
  - 1. Class A B:C.
  - 2. Size 10.
  - 3. Finish: Baked enamel, Red color.

**2.03 FIRE EXTINGUISHER CABINETS**

- A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.
- B. Cabinet Configuration: Semi-recessed type.
  - 1. Sized to accommodate accessories.
  - 2. Trim: 2-1/2 inch rolled edge.
  - 3. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
- C. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon catch.
- D. Door Glazing: Tempered Glass, clear, 1/8 inch thick . Set in resilient channel gasket glazing.
- E. Finish of Cabinet Exterior Trim and Door: Aluminum Anodized to Clear color.
- F. Finish of Cabinet Interior: White enamel.

**2.04 ACCESSORIES**

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, 24 inches from floor to inside bottom of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.

### **3.03 SCHEDULES**

- A. F.E. = Fire Extinguisher with wall bracket.
- B. F.E.C. = Fire Extinguisher with semi-recessed cabinet.

**END OF SECTION**

**SECTION 21 05 00**  
**COMMON WORK RESULTS FOR FIRE-SUPPRESSION**

**PART 1 GENERAL**

**1.1 WORK INCLUDES**

- A. Furnishing labor, materials, equipment and services required for the complete installation of new and remodel of existing fire protection shown on the Drawings and specified in Division 21.
- B. All work shall be complete and shall be left in operating condition.
- C. Include all parts and labor, which are incidental and necessary for a complete and operable installation even though not specifically mentioned in the Contract Documents.
- D. Some equipment and materials provided under Division 21, 22, 23, 25 or Division 26 may require composite work crews because of trade jurisdiction. Where this occurs, include in the bid this portion of the composite crew labor costs. It is the Contractor's responsibility to review Division 21, 22, 23, 25 and Division 26 Contract Documents to determine where these composite crews are required.
- E. Obtain all temporary and permanent permits and licenses required in connection with this Division's work. Pay all fees and expenses required for such permits and licenses.
- F. Request inspections as required by regulating agencies and/or regulations. Pay all charges for inspections by regulating agencies of installations of plans specifications.
- G. Include State and Local sales taxes in the bid. Keep accurate records of these taxes and furnish such records to the Owner upon request.
- H. Provide the Owner with a certificate of final inspection and approval by enforcement authorities.
- I. Furnish labor, equipment, and materials required for cutting, demolition, removal, patching, and restoration work necessary to accomplish and complete all demolition, including any relocation or reuse of existing materials, equipment, systems, as well as the disposition of salvaged materials or debris.

**1.2 RELATED SECTIONS:**

- A. General Provisions are specifically applicable to all Division 21 Sections.
- B. Divisions 0 and 1 apply to all work of Division 21 and are an integral part of this Section. Where the conditions specified are at variance with other Divisions, Section 21 05 00 takes precedence. Section 21 05 00 specifies conditions, procedures, equipment and material particular to the mechanical work and applies to all mechanical work of the Contract Documents.
- C. Division 0 and 1 and Section 21 05 00 and all Addenda form a part of and apply to all contracts or sub-contracts relating to Division 21 work. Copy these documents to all Sub-contractors receiving other Sections of Division 21.
- D. Where a Specification Section refers to other Sections under the Article on "Related Sections", this is done for Contractor's convenience only. It shall in no way relieve the Contractor of responsibilities stated in other Sections of the Specifications, even though these Sections are not specifically referenced. The Contractor is responsible for all information contained in this Division's Specifications as well as for information contained in all other Divisions.

**1.3 REGULATORY REQUIREMENTS**

- A. Meet or exceed all current applicable codes, ordinances and regulations for all installations. Promptly notify the Engineer, in writing, if the contract documents appear to conflict with governing codes and regulations. Contractor assumes all responsibility and costs for correcting non-complying work installed without notifying the Engineer.

- B. Higher quality of workmanship and materials indicated in the Contract Documents takes precedence over that allowed in referenced codes and standards.
- C. Perform all work in compliance with the currently adopted version of the following codes and standards for this project:

- Americans with Disabilities Act
- Municipal Water and Sewer Regulations
- National Electric Code
- NFPA 101 Life Safety Code
- Occupational Safety and Health Administration Regulations
- State and Local Building Codes
- State and Local Electrical Codes
- State and Local Fire Codes and Regulations
- State and Local Mechanical Codes
- State and Local Plumbing Codes
- State Industrial Commission Regulations
- State Elevator Code
- State Energy Code
- Uniform Federal Accessibility Standards

#### **1.4 REFERENCES**

- A. Use the Standard where referenced in the specifications by the following abbreviations:
  - AIA - American Institute of Architects
  - ANSI - American National Standards Institute
  - ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
  - ASME - American Society of Mechanical Engineers
  - ASTM - American Society of Testing and Materials
  - AWWA - American Water Works Association
  - EPA - Environmental Protection Agency
  - FM - Factory Mutual
  - IEEE - Institute of Electrical and Electronic Engineers
  - IES - Illuminating Engineering Society of North America
  - ICEA - International Cable Engineers Association
  - IRI - Industrial Risk Insurance
  - NEBB - National Environmental Balancing Bureau
  - NBFU - National Bureau of Fire Underwriters
  - NBS - National Bureau of Standards
  - NEMA - National Electrical Manufacturers Association
  - NFPA - National Fire Protection Association
  - NSC - National Safety Council
  - OSHA - Occupational Safety and Health Administration
  - PDI - Plumbing and Drainage Institute
  - UL - Underwriter's Laboratories

#### **1.5 DEFINITIONS**

- A. Contract Documents: References to Contract Documents refers to a complete set of Drawings and Specifications for the entire Project. Drawings and Specifications are intended to supplement one another. Provide items shown on the Drawings but not mentioned in the Specifications and items mentioned but not shown the same as if they were both mentioned and shown. Bid the most expensive interpretation of a conflict between Drawings and Specifications so the conflict can be resolved with a deduct rather than an add to the contract amount.
- B. Dimensions: Arrangement of equipment, accessories, piping and ductwork on the Drawings is generally diagrammatic unless the Drawings include dimensions. Do not scale the Drawings. Field verify all dimensions at the site to locate new and existing work.

- C. Furnish: To obtain, coordinate, submit the necessary drawings, deliver to the job site in new condition ready for installation, unload and unpack, and guarantee.
- D. Install: To receive at the job site, store, assemble, erect, set in place, anchor, apply, finish, protect, clean, test, start-up, and make ready for Owner's use.
- E. Provide: To furnish and install.
- F. Responsibility: Where verbs such as "furnish", "provide", "install", or "use" appear in the Contract Documents, they mean, "The Mechanical Contractor shall furnish, provide, install, or use....." unless the requirement is introduced by a phrase, sentence or heading specifically identifying the requirement as the responsibility of someone else.

## 1.6 SUBMITTALS

### A. Substitutions

1. Submit written requests to use products not listed in the Specifications to the Engineer no later than ten (10) calendar days prior to the bid opening. Submit detailed information for proposed material or equipment.
2. Accepted substitutions will be incorporated in an Addendum to the Contract Documents.
3. Contractor is responsible for dimensional differences, weights, electrical requirements and any other resulting changes, when using equipment other than that scheduled on the Drawings. Contractor is responsible for any additional costs incurred as a result of substitutions, including other Contractors and Architect/Engineer fees.
4. Material and equipment not listed in the Specifications or accepted in an Addendum will be removed and replaced at no cost or inconvenience to the Owner.

### B. List of Materials, Equipment and Sub-Contractors

1. Submit a complete list of all materials, equipment, and sub-contractors, proposed to be used on this project, to the Engineer within seven (7) calendar days of the award of contract or written notice to proceed.
2. Acceptance of items on the list are considered final, unless additional information or submissions are required by the Engineer. Unacceptable items will be rejected and resubmitted.

### C. Pay Request Cost Breakdown

1. Provide Schedule of Values for the utilization of submitting a "Pay Request". Allocate appropriate share of overhead and profit to each item. Separate each item into labor and material.
2. Submit cost breakdown on AIA document G703. Provide minimum breakdown as indicated below. Provide additional breakdown as required for clarity or as requested by the Engineer.
  - a. Basic Materials and Methods
  - b. Fire Protection Piping

### D. Submittals for Review

1. Submit in accordance with Division 0 and Division 1. Submit drawings to the Engineer for review within 30 calendar days after award of Contract.
2. Include project name, name of Architect, name of Engineer, contractor, sub-contractor, manufacturer, supplier and sales representative, include name, address, and phone number for the sales representative. Clearly identify section number and description of equipment submitted. Shop drawings not including all of this information will be returned without review.

3. Examine all shop drawings noting capacity, arrangement and physical dimensions. Clearly mark all relevant items on catalog data and cross-out unrelated information. For remodeling projects; show existing piping layout and sprinkler locations and any modifications in the remodeled areas. Review and stamp shop drawing prior to submitting to the Engineer.
4. Submit a minimum of one PDF copy of each set of shop drawings based off of specification sections. The Engineer will distribute as follows:
  - a. Engineer - One (1) copy.
  - b. Architect - One (1) copy.
  - c. Remaining copies or red lined PDF copy shall be returned to the Architect, Construction Manager or General Contractor - (two copies to be incorporated into the O&M Manuals.
5. All shop drawings must be reviewed and accepted by the Engineer prior to fabrication and installation.
6. Submittals will be reviewed with the following actions:
  - a. NO EXCEPTIONS TAKEN—Indicates the Submittal appears to conform to the design concept of the Work and that the Contractor at his discretion, may proceed with fabrication and/or procurement and installation.
  - b. MAKE CORRECTIONS NOTED—Indicates that the Submittals, after noted corrections are made, would appear to conform to the design concept of the Work and that the Contractor, at his discretion, may proceed with fabrication and/or procurement and installation, if the corrections are accepted by the Contractor without an increase in Contract Sum or Time.
  - c. REJECTED—Indicates that the Submittal does not appear to conform to the specifications, and that a complete resubmittal is required. The Contractor shall not proceed with fabrication or procurement.
  - d. NO ENGINEER ACTION REQUIRED—Indicates the Contractor may proceed without review of the Submittal based on provisions of the Contract Documents.
7. Allow a minimum of fourteen (14) calendar days for the Engineer to review the shop drawings. Time is from the receipt of drawings in the Engineers office until they are shipped out of the office.
8. If the Engineer rejects (Make corrections noted/Submit corrected copy, Rejected/Submit specified item) two (2) times for the same section the Engineer will be compensated for the additional reviews. Compensation will be incorporated by Change Order and deducted from the Contractor's application for payment. Contractor is responsible for delays caused by the resubmittal process.
9. Submit shop drawings for the following equipment and systems:

Section	Description
21 05 13	Common Motor Requirements for Fire-Suppression Equipment
21 05 23	General Duty Valves for Fire-Suppression Piping
21 05 29	Hanger and Supports for Fire-Suppression Piping and Equipment

## 1.7 CAD DRAWING FILES

- A. The mechanical CAD drawing files prepared by Hallberg Engineering, Inc. for this project are Instruments of Service of Hallberg Engineering, Inc. for use solely with respect to this project and will not be made available to the Contractor.
- B. Request CAD drawing files of Architectural floor plans, elevations, sections, etc directly from the Architect.

## 1.8 QUALITY ASSURANCE

- A. Regulatory Requirements:

1. Initiate, maintain and supervise all safety precautions required with this work in accordance with the regulations of the Occupational Safety and Health Administration (OSHA) and other governing agencies.
- B. Environmental Requirements:
  1. Do not remove or disturb any asbestos containing materials from the project. Immediately stop work and notify the Owner if asbestos containing materials are suspected.
- C. Accomplish all work of cutting, removal, demolition, relocation, patching, and restoration by using only mechanics skilled in the trade required. Provide for the safety of the existing building and personnel, as well as for new construction as a result of work, procedures, operations or activities under this Contract.
- D. Where the work of removals, demolition, cutting and similar work involves structural considerations, consult with Engineer. Exercise extreme care to avoid damage and preserve the safety of the structure and of all personnel. Particular care must be taken where the demolition or removals occur adjacent to occupied areas.
- E. Utilize competent and qualified technical assistance to develop safe methods and techniques to accomplish the work, including temporary shoring and supports, methods of removal and other considerations. Design and place all permanent or temporary supports to carry all loads down to sound bearing.

## **1.9 PROJECT/SITE CONDITIONS**

- A. Site Inspections:
  1. Before submitting a proposal on the work contemplated, examine the site of the proposed work and become thoroughly familiar with existing conditions and limitations. No extra compensation will be allowed because of misunderstanding as to the amount of work involved or bidder's lack of knowledge of existing conditions which could have been discovered or reasonably anticipated prior to bidding.
  2. Mechanical equipment and systems shown on the drawings as existing, have been based on existing plans, and may not be installed as originally shown. It is the contractors' responsibility to visit the site and make exact determination of the existence, location and condition of such facilities prior to submitting a bid.
- B. Correlation of Work:
  1. Consult the drawings and specifications of Division 26 and other trades for correlating information and lay out work so that it will coordinate with other trades. Verify dimensions and conditions (i.e., finished ceiling heights, footing and foundation elevations, beam depths, etc.) with the Architectural and Structural drawings. Notify the Architect/Engineer of any conflicts that can not be resolved, in the field, by affected trades. Replacement of work due to lack of coordination and failure to verify existing conditions will be completed at no cost to the Owner.
  2. Drawings may not show every rise and offset required for the work. Install piping to accommodate the building structure and the work of other trades, with all required offsets and without extra cost to the Owner.
  3. Where work must be replaced due to the failure of the Contractor to verify the conditions existing on the job, such replacement must be accomplished at no cost to the Owner. This applies to shop fabricated work as well as to work fabricated in place.
  4. Throughout the course of the work, minor changes and adjustments to the installation may be requested by the Engineer. The Contractor shall make adjustments without additional cost to the Owner, where such adjustments are necessary to the proper installation and operation within the intent of the Contract Documents. This does not include work already completed.

5. Equipment outlines shown on detail plans of 1/4"=1'-0" scale or larger and/or dimensions indicated on the plans are limiting dimensions. Do not install any equipment that exceeds the equipment outlines shown or reduces indicated clearances.
6. Obtain exact location of connection to equipment, furnished by others, from the person furnishing the equipment.
7. Drawings and Specifications are complementary and what is called for in either is as binding as if called for in both.
8. Include the better quality, greater quantity or higher cost for an item or arrangement where a disagreement exists in the Drawings and Specifications.

#### **1.10 WARRANTY**

- A. Guarantee and maintain the stability of work and materials and keep same in perfect repair and condition for the period of one (1) year after the final completion of the work as evidenced by issuance of the final certificate by the Architect and signed off final punchlists by the engineer and approval from the commissioning agent (If applicable).
- B. Defects of any kind due to faulty work or materials appearing during the above mentioned period must be immediately made good by the Contractor at his own expense to the entire satisfaction of the Owner and Architect and Engineer. Include damage to the finish or the building resulting from the original defect or repairs.
- C. Guarantee does not apply to injuries occurring after final acceptance and due to wind, fire, violence, abuse or carelessness or other Contractors or their employees or the agents of the Owner.
- D. Guarantee does not apply where other guarantees for different lengths of time are specified in other Sections.

#### **1.11 ELECTRICAL**

- A. Control and interlock wiring provided by the Sprinkler Contractor, unless otherwise specified.

### **PART 2 PRODUCTS**

#### **2.1 ACCEPTABLE MANUFACTURER'S, VENDORS, SUPPLIERS OR AGENTS**

- A. Provide only products and services from manufacturers, vendors, suppliers or agencies with local representation and listed in these specifications that can provide complete coverage, parts and labor, for replacement and service of their products and listed in these specifications. Provide only equipment that will fit in the space available and be completely serviceable. Bring any conflicts to the Engineer's attention prior to ordering the equipment. Wholesale suppliers are not considered manufacturer representative unless they can provide the services listed in these specifications.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Continuity of Service:
  1. Coordinate/schedule all work with the Owner to minimize any disruptions. Confine all interruptions to the smallest possible area. Provide temporary connections if required to provide continuity of service.
  2. Inspect all areas affected by the interruptions and return all automatically controlled equipment, electrically operated equipment to the same operating condition prior to the interruption.



3. No fire sprinkler or fire alarm systems are to remain inactive at the end of the work day. Assure that the fire sprinkler or fire alarm system is operational at the end of each work day. Coordinate with the Owner.

B. Use of Facility:

1. Do not disturb normal use of the facility, except within the immediate construction area. Keep walks, driveways, entrances, etc. free and clear of equipment, material and debris.
2. Store all equipment and material in a place and manner that minimizes congestion and is approved by the Owner.

### 3.2 DEMOLITION

- A. The Drawings generally indicate the extent of demolition, removals, relocations and cutting.
- B. The Drawings are not to be construed as indicating all required work, nor indicating all conditions or details which might be encountered during progress of the work of this Contract.
- C. Examine all areas where demolition is to occur to determine the actual conditions and requirements
- D. Provide temporary bracing, shoring, and support for the execution of the work and the protection of persons and property during demolition, cutting, remodeling and all related new construction under this Contract. Perform all work with appropriate supports, protection and methods to prevent collapse, settling or damage to property or persons. Provide adequate supports for the loads to be carried, properly distributed, to lower levels or to sound bearing, if necessary.
- E. Provide all protective coverings and enclosures necessary to prevent damage to existing spaces and materials which are to remain. Protect openings in exterior walls and roofs to prevent damage from water and weather and to prevent excessive heat loss from the existing buildings. Maintain a watertight installation by scheduling the work and removals at the exterior according to weather conditions. Temporarily seal unfinished areas to the existing roof or to other exterior surfaces of the existing building.
- F. Provide dustproof temporary enclosures (including above ceilings) to separate the areas under demolition and remodeling from the remainder of the building. Also provide temporary air filters and ductwork to keep construction dust contained within the construction area. Provide temporary hinged doors in temporary enclosures where necessary. Temporary and permanent doors shall be completely sealed with tape or other suitable materials during demolition work and shall remain sealed until the dust has settled.
- G. Demolish and remove existing construction as shown or indicated or as required to accomplish the work.
- H. Where new work is to be installed in or adjacent to existing construction or when existing work is to be replaced, remove or cut the existing construction as necessary to complete the work under the Contract.
- I. Execute the work with care. Remove and replace existing construction that is to remain which is loosened, cracked, or otherwise damaged or defaced, or is rendered unsuitable for its intended use, as a result of the work at no additional cost to the Owner.
- J. Clean demolition areas and remove debris, waste and rubbish from the building at the conclusion of each day's work. Transport debris and rubbish in a manner that prevents the spread of dust. Do not store or permit debris storage at the site. Do not burn or permit the burning of debris, rubbish or waste at the site. Keep adjacent areas unencumbered and clean. Keep all construction areas essentially broom clean.
- K. Abandoned services may be left in place where they will be concealed inside floors or walls, providing they are disconnected from their sources and capped in place. No abandoned services in ceilings or exposed.

- L. Based on a site inspection and the Contract Documents, the Contractor is responsible for the removal or rerouting of all anticipated mechanical work, exposed and concealed.
- M. Where unanticipated mechanical work is exposed during the removal of partitions, walls, floors or ceilings, the removal or rerouting of this work shall be accomplished by the Contractor under the direction of the Engineer.
- N. Patch or otherwise restore disturbed existing construction and surfaces. Patching or restoration shall be carried to natural breaks. Where existing construction is removed, cut or otherwise disturbed, patch all such disturbed and damaged surfaces.
- O. Perform patching work by skilled mechanics experienced in the particular type of work involved. Conform to the standards of the Specifications where applicable, and where not specified, conform to the highest standards of the trade.
- P. Patch existing construction to match existing work, but always provide new materials and accomplish the work according to current standards. Examine existing surfaces before proceeding with the work. Report all conditions to the engineer, architect or owner, where existing materials, colors and finishes cannot be matched, but do not proceed until receiving instructions.
- Q. Repair existing construction that has been damaged as a result of the work to the extent required to match existing, undamaged construction.
- R. All holes created by removal of existing systems, piping, ductwork, control wiring, tubing, etc., shall be patched and fire caulked.

### **3.3 INSTALLATION**

#### **A. Material and Workmanship**

- 1. Provide new material and equipment, unless noted otherwise. Protect equipment and material from damage, dirt and the weather.
- 2. Provide the highest quality workmanship and perform all work only by skilled mechanics. Install material and equipment in accordance with manufacturers' recommendations, instructions and current standards.
- 3. The Engineer reserves the right to reject material or workmanship not in accordance with the Contract Documents, before or after installation.

#### **B. Piping**

- 1. All piping shall be run in the most direct and straight manner possible maintaining proper grading.
- 2. It is the intent of these plans and specifications that most piping be concealed. Where exposed, run as close to ceiling/structure/roof deck and/or wall as possible parallel with adjacent structural or architectural elements.
- 3. Do not install piping in any switchgear, transformer, elevator equipment, IT closet, telephone closet, security closet, or other similar type electrical and/or electronic equipment room, unless the room is too large for sidewall heads, then only the branch serving that room may be installed.
- 4. Do not install piping above switchboards, panelboards, control panels, motor control centers, data or security equipment, etc.
- 5. Arrange work to facilitate maintenance, repair or replacement of equipment. Provide access for devices that require maintenance. For concealed devices, verify that access panels are properly located and labeled.

#### **C. Equipment:**

- 1. Install material and equipment in accordance with the Manufacturer's written instructions.

#### **D. Cutting and Patching:**

1. Perform all cutting and patching necessary to work, unless specifically delegated to the General Contractor. Obtain special permission from the engineer before cutting structural members or finished material. Perform all patching in such a manner as to leave no visible trace and return the area affected to the condition of undisturbed work. Perform all patching by workers experienced, skilled, and licensed for the particular type of work involved. Inferior work will not be accepted.
2. Patch all holes left as a result of demolition of mechanical equipment and devices.
3. Drill all holes in masonry with rotary drill. Impact tools are not allowed. Core drill all holes in masonry and concrete for mechanical penetrations. Provide and dispose of all water required for core drilling. Coordinate with other trades to prevent damage from water.
4. Prevent the spread of dust, debris, and other material into adjacent areas.
5. Replace all ceiling tiles damaged during installation of work, with new tile.

E. Record Drawings:

1. Provide Record Drawings in accordance with the requirements of Division 0 and Division 1.
2. Maintain a complete set Record Drawings showing all modifications to the Contract Documents. Drawings will be stamped "Record Drawings" and used only for that purpose.
3. As work progresses, record all changes or deviations from the contract drawings in a neat and legible manner as follows:
  - a. Record exact location and elevation of underground piping systems including changes in direction, invert elevation, sizes, etc., by reference to building lines, structure, footings, hydrants, and other permanent reference points.
  - b. Record routing of concealed and exposed above ground mechanical systems where it varies from the Contract Documents. Include elevations above finished floors.
4. The Engineer may recommend withholding payment if Record Drawings are not being maintained.
5. Submit Record Drawings to the Engineer for review at completion of the Work. Submit final record drawings as part of the Operation and Maintenance Manual package after the completion of the project.

### 3.4 TEMPORARY UTILITIES

- A. Do not use sprinkler system provided in this scope of work for temporary services during construction unless approved by local authority and engineer. Provide any protection devices such as backflow preventors as needed to meet any local or munciple requirements to prevent contamination.

### 3.5 PROTECTION

- A. Protect openings and equipment from obstruction, breakage, misuse, damage or blemishes. Protect materials and equipment immediately upon receipt at the job site or immediately after they have been removed from their shipping containers. Unless noted otherwise, keep them clean and undamaged until final acceptance of the entire Project by the Owner. When a portion of the building is occupied by the Owner before substantial completion of the entire Project, make arrangements to transfer responsibility for protection and housekeeping for the occupied portion.
- B. Protect pipe and equipment openings with temporary plugs or caps. Keep openings covered until permanent connections are complete.
- C. Contractor is responsible for any damage to mechanical equipment, materials or work until final acceptance of the entire project by the Owner.
- D. Contractor is responsible for any damage to mechanical equipment, materials or work until final acceptance of the entire project by the Owner.

- E. Contractor shall store all equipment, components, heads, etc. not designed for exterior use in a clean, dry space protected from weather such as inside a building or in weatherproof storage containers. Covering with poly or tarp is unacceptable.
- F. Contractor shall protect all floors, walls, ceilings, etc. Provide plywood, poly, tarps, etc. to prevent any damage to the building and finishes.

### **3.6 CLEAN UP**

- A. Keep the premises free from accumulation of waste material or rubbish, caused by his employees or work, at all times. Remove rubbish, tools, scaffolding, and surplus materials from and about the building, and leave work areas "broom clean" or its equivalent upon completion of the work. Clean mechanical equipment and remove temporary identification.
- B. Provide final cleaning (mop clean) prior to start up of equipment and systems and owner occupancy. Provide final cleaning (wipe down) of all mechanical equipment, piping, components, and remove any temporary identification. Thoroughly clean and prep all piping and components designated for painting.
- C. In case of dispute, the Owner will remove the rubbish and charge the cost to the Contractor.

### **3.7 START-UP**

- A. Before start-up, lubricate, charge, and fill systems as specified and according to Manufacturer's instructions.
- B. Provide final cleaning in accordance with that Section.
- C. Test fire protection systems as specified in Sections governing their installation.
- D. Perform testing, adjusting and balancing in accordance with that Section.
- E. Operate equipment and systems in all their operating modes, to verify proper operation, prior to final field observation and Owner instructions. Notify the Engineer, in writing, that all systems have been tested and are functioning and operating properly.

### **3.8 FIELD OBSERVATION REPORTS (FINAL AND PRELIMINARY)**

- A. Preliminary field observations reports shall be issued for ongoing status of the construction project. Any deficiencies noted on field reports need to be corrected and responded to in writing prior to start of the Final Field Report.
- B. A final field observation of the mechanical systems will be required before Contract Closeout. Request a final observation by the Engineer after all systems are fully completed and operational. The Engineer will schedule a field observation and generate a list of items to be corrected or completed before Contract Closeout.
- C. If the Engineer is requested to make a final field observation by the Contractor, and the Engineer finds the work is not complete enough to perform that observation, the Contractor will compensate the Engineer for their time. The Contractor will then perform the necessary work to complete the project and again request a Final Field Observation.

### **3.9 TRAINING**

- A. Fully instruct the Owner's designated personnel in the operation of each mechanical system at the time it is put into service. Provide instruction using competent instructors and factory trained personnel.
- B. Provide videotaping of the training session and include on a disc for the owner in each copy of the O & M Manual.
- C. Include documentation of instructions in the Operation and Maintenance Manuals.
- D. Obtain a written statement from the Owner that his designated personnel have been instructed.

### **3.10 PROJECT CLOSEOUT**

- A. Operating and Maintenance Manuals: Submit to the Engineer two (2) Operating and Maintenance manuals. Submit in portfolio form neatly edited with similar equipment grouped, tabbed and indexed. Provide printed or typewritten materials. Provide the following in each manual:
1. Shop drawings, approved manufacturer's bulletins, and other appropriate data from specific manufacturer of each piece of equipment furnished and/or installed. Shop drawings, manufacturer's bulletin, and other data shall be appropriate marked to reflect the "as-built" condition. Cross out or delete all information shown on shop drawings or literature not applying to this specific project.
  2. Copies of manufacturer's warranties
  3. Operating instruction for equipment.
  4. Wiring and installation instructions for equipment.
  5. Recommended maintenance schedules and procedures for equipment.
  6. Recommended trouble shooting procedures for equipment.
  7. Equipment parts list.
  8. Settings/adjustments/calibrations for systems as required.
  9. Local equipment suppliers/ reps names, addresses, and telephone numbers.
  10. Equipment manufacturers names, addresses, and telephone numbers.
  11. Sub-contractors names, addresses, and telephone numbers.
  12. Test reports.
  13. Certifications.
  14. Test and balance reports.
  15. System validation reports.
  16. Statements from Contractor that all incomplete items noted in Engineer's Final Field Observation Report have been completed.
  17. Statement from Owner confirming completion of Training.
  18. Refer to individual Sections in Division 21 for additional requirements.
- B. Record Drawings: Submit Record Drawings.
- C. Extra Materials: Refer to individual Specification Sections for extra materials to be provided to the Owner.
- D. System Startup: Refer to individual Specification Sections for system startup requirements.

### **3.11 JOB CLOSEOUT AND DOCUMENT TURNOVER**

- A. Construction Documents CD's, Owner and Operation Manuals (O&M's), As-Builts, Specifications and other documents turned over at the completion of the projects shall be furnished to the Owner in both paper hard copy and digital Adobe PDF.
1. Record Drawings (As-Builts)
    - a. PDF Creation: Each roll of drawings shall be scanned or converted to PDF to one single PDF document. Include all approved PR's, Change Order, CCD's, field changes, etc. in closeout documents.
      - 1) Scanning:
        - i) 200DPI Grayscale

- ii) Cropped to original size
  - iii) Color corrected and despeckled
- b. Bookmarking: Each page of the PDF shall be bookmarked with the number and name of the sheet.
- c. Naming: The PDF shall be labeled: "Building Name\_Year\_Title\_Spec\_Type"
  - 1) Name = Building Name
  - 2) Year = Date of Documents
  - 3) Title = "Addition" "Remodel," etc...
  - 4) CD = Construction Document
  - 5) Type = Arch, Mech, Electrical Communications or a combination of the above
- 2. Owners and Operation Manuals
  - a. O & M's shall be turned over by the Contractor.
  - b. PDF Creation: Each book of specifications shall be scanned or converted to PDF to one single PDF document.
    - 1) Scanning:
      - i) 200 DPI Grayscale
      - ii) Bookmarking: Bookmarking of O & M Manuals shall be extensive.

**END OF SECTION**

**SECTION 21 05 23**  
**GENERAL DUTY VALVES FOR FIRE-SUPPRESSION PIPING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Gate Valves.
- B. Butterfly Valves.
- C. Check Valves.
- D. Ball Valves.
- E. Drain Valves.
- F. Piping Specialties.

**1.2 RELATED SECTIONS**

- A. Section 21 05 00 – Common Work Results for Fire-Suppression.
- B. Section 21 05 29 - Hangers and Supports for Fire-Suppression Piping and Equipment.

**1.3 REFERENCES**

- A. NFPA 13 - Installation of Sprinkler Systems.
- B. NFPA 101 – Life Safety Code.
- C. FM - Factory Mutual Approval Guide.
- D. NFPA 70 - National Electrical Code.
- E. UL - Fire Resistance Directory.
- F. UL 199 - Automatic Sprinklers.
- G. UL 262 - Gate Valves for Fire-Protection Service.
- H. UL 312 - Check Valves for Fire-Protection Service.
- I. Warnock Hersey - Certification Listings.

**1.4 SYSTEM DESCRIPTION**

- A. Provide fire department connection where indicated, with prior approval from the authority having jurisdiction.

**1.5 SUBMITTALS FOR REVIEW**

- A. Section 21 05 00 - Submittals: Procedures for submittals.
- B. Product Data: Provide data on valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.

**1.6 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 21 05 00 Project Closeout.

**1.7 REGULATORY REQUIREMENTS**

- A. Conform to [UL] [FM] [Warnock Hersey].
- B. Perform Work in accordance with [NFPA 13] [NFPA 13R].

- C. Equipment and Components: Bear [UL] [FM] [Warnock Hersey] [ ] label or marking per [NFPA 13] [NFPA 13R].
- D. Valves: Bear [UL] [FM] [Warnock Hersey] label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- E. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.
- F. The water service connection, fire department connection, sprinkler system, and valve assembly shall comply with the City of [ ] water and fire department requirements.

## **1.8 DELIVERY, STORAGE, AND PROTECTION**

- A. Store products in shipping containers and maintain in place until installation. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

## **1.9 EXTRA MATERIALS**

- A. Section 21 05 00- Project Closeout.

## **PART 2 PRODUCTS**

### **2.1 GATE VALVES**

- A. Manufacturers: (All gate valves on this project shall be of the same manufacturer.)
  - 1. Central.
  - 2. Kennedy.
  - 3. Mueller.
  - 4. Nibco.
  - 5. Victaulic
  - 6. Substitutions: Refer to Section 21 05 00.
- B. Up to and including 2 inches: Nibco T-104-0 or approved equal.
  - 1. Class 175, Bronze body, bronze trim, rising stem, handwheel, solid wedge or disc, threaded ends.
- C. Over 2 inches: Nibco F-607-0.
  - 1. Class 175, Iron body, bronze trim, rising stem, handwheel, OS&Y, solid bronze or cast iron wedge, flanged ends.

### **2.2 BUTTERFLY VALVES**

- A. Manufacturers: (All butterfly valves on this project shall be of the same manufacturer.)
  - 1. Central.
  - 2. Kennedy.
  - 3. Mueller.
  - 4. Nibco
  - 5. Victaulic
  - 6. Substitutions: Refer to Section 21 05 00.
- B. Over 2 inches: Central Model A, Class 175, cast or ductile iron, stainless steel stem and disc, resilient replaceable EPDM seat, wafer, lug, or grooved ends, extended neck, handwheel and gear drive and integral indicating device, with dual supervisory tamper switch.



## 2.3 CHECK VALVES

- A. Manufacturers: (All check valves on this project shall be of the same manufacturer.)
1. Central.
  2. Kennedy.
  3. Mueller.
  4. Nibco.
  5. Ames.
  6. Victaulic
  7. Substitutions: Refer to Section 21 05 00.
- B. Up to and including 2 inches: Nibco T453-B.
1. Class 200, bronze body and horizontal swing disc, bronze seat, threaded ends.
- C. Over 2-1/2 inches: Central Model 590F or approved equal.
1. Class 175, ductile iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends or grooved end.
- D. Detector check valves: Ames 1000 DCV or approved equal.
1. Steel or cast iron body, stainless steel spring, bronze seat ring, flanged ends.

## 2.4 BALL VALVES

- A. Up to and including 2 inches:
1. Manufacturer: Apollo 77-100/77-200 Series, or equivalent by:
    - a. Hammond.
    - b. Kitz.
    - c. Milwaukee.
    - d. Nibco.
    - e. Watts.
    - f. Substitutions: Refer to Section 22 05 00.
  2. Construction: Class 150, 600 psig wog, bronze, two piece body, chrome plated brass ball, full port, teflon seats and stuffing box ring, brass blow-out proof stem, lever handle [with balancing stops], solder or threaded ends [with union]. Extended stems for use on insulated pipe.
- B. [Up to and including 2 inches:
1. Manufacturer: Apollo 82-100/82-200 Series, or equivalent by:
    - a. Hammond.
    - b. Kitz.
    - c. Milwaukee.
    - d. Nibco.
    - e. Watts.
    - f. Substitutions: Refer to Section 22 05 00.

2. Construction: Class 150, 600 psig wog, bronze, three piece body, chrome plated brass ball, full port, teflon seats and stuffing box ring, brass blow-out proof stem, lever handle [with balancing stops], solder or threaded ends [with union]. Extended stems for use on insulated pipe.]

## **2.5 DRAIN VALVES**

A. Manufacturers: (All drain valves on this project shall be of the same manufacturer.)

1. Central.
2. Kennedy.
3. Nibco
4. Victaulic
5. Substitutions: Refer to Section 21 05 00.

B. Globe and Angle Valve: Nibco T-211, T-311 or approved equal.

1. Class 200, bronze body, threaded ends, bronze stem, malleable hand wheel.

## **2.6 PIPING SPECIALTIES**

A. Water Flow Switch: Vane type switch for mounting horizontal or vertical, with two contacts; rated 10 amp at 125 volt AC and 2.5 amp at 24 volt DC.

B. Supervisory Switches: Potter Model OSYSU-A2 on OS & Y gate valves without self contained switches. Potter Model PCVS or post indicator valves without self contained switches.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with NFPA 13.
- B. Install equipment in accordance with manufacturers instructions.
- C. Install buried shut-off valves in valve box. Provide post indicator.
- D. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.
- E. Provide gate or butterfly valves for shut-off or isolating service.
- F. Provide a keyed lock and chain on all valves in the open position controlling sprinklers. Provide Owner with keys and location of each corresponding lock.
- G. Provide drain valves at main shut-off valves, low points of piping and apparatus.

### **3.2 INTERFACE WITH OTHER PRODUCTS**

A. Ensure required devices are installed and connected as required to fire alarm system.

### **3.3 ELECTRICAL WIRING**

A. Wiring for flow switches, valve supervisory switches, supervisory pressure switches, and power to air compressors will be provided under Division 16. Coordinate location of these devices with the Electrical Contractor.

**END OF SECTION**

## **SECTION 21 05 29**

### **HANGERS & SUPPORTS FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Pipe and equipment hangers and supports.
- B. Equipment bases and supports.
- C. Sleeves and seals.
- D. Flashing and sealing equipment and pipe stacks.

##### **1.2 RELATED SECTIONS**

- A. Section 21 05 00 – Common Work Results for Fire-Suppression.
- B. Section 21 13 00 – Fire-Suppression Sprinkler System.

##### **1.3 REFERENCES**

- A. NFPA 13 - Installation of Sprinkler Systems.
- B. NFPA 14 - Installation of Standpipe and Hose Systems
- C. UL 203 - Pipe Hanger Equipment for Fire Protection Service

##### **1.4 SUBMITTALS**

- A. Shop Drawings: Indicate system layout with locations and details of all types of hangers.
- B. Product Data: Provide manufacturers catalog data including load capacity.
- C. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.
- D. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

##### **1.5 REGULATORY REQUIREMENTS**

- A. Supports for Sprinkler Piping: In conformance with NFPA 13.
- B. Supports for Standpipes: In conformance with NFPA 14.

#### **PART 2 PRODUCTS**

##### **2.1 PIPE HANGERS AND SUPPORTS**

- A. Manufacturers:
  - 1. Anvil.
  - 2. B-Line Systems.
  - 3. Michigan.
  - 4. Tolco.
  - 5. Substitutions: Under provisions of Section 21 05 00.
- B. Fire Protection Piping:
  - 1. Conform to NFPA 13 [and NFPA 14].
  - 2. Hangers for Pipe Sizes 1 to 8 inch: Carbon steel adjustable swivel hanger.

3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
4. Wall Support for Pipe Sizes 2-1/2 inches and Over: Welded steel bracket and wrought steel clamp.
5. Vertical Support: Carbon steel riser clamp.
6. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, cast iron, floor flange, and concrete pier or steel support.
7. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## **2.2 HANGER RODS**

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded. Stainless steel in areas of high humidity.

## **2.3 INSERTS**

- A. Manufacturers: Anvil Figure 282 (8 inches and smaller). Anvil Figure 282 with Figure 66 attachment (larger than 8 inches). Other acceptable manufacturers offering equivalent products.
  1. B-Line Systems.
  2. Michigan.
- B. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

## **2.4 FLASHING**

- A. Metal Flashing: 26 gage thick galvanized steel.
- B. Metal Counterflashing: 22 gage thick galvanized steel.
- C. Lead Flashing:
  1. Waterproofing: 5 lb/sq ft sheet lead
  2. Soundproofing: 1 lb/sq ft sheet lead.
- D. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- E. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

## **2.5 SLEEVES**

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- D. Sleeves for Pipes in building walls below grade: modular wall seal.
- E. Stuffing and Fire stopping Insulation: Glass fiber type, non-combustible.
- F. Sealant: Acrylic.

## **2.6 FIRESTOP SYSTEMS**

- A. Manufacturer:
  1. 3M (Minnesota Mining and Manufacturing Co.).
  2. Hilti.

3. Substitutions: Under provisions of Section 21 05 00.
- B. Firestop systems that are produced and installed to resist the spread of fire according to requirements indicated, resist passage of smoke and other gasses, and maintain original fire-resistance rating of construction assembly.
- C. Certificate of conformance for through-penetration requirements of ASTM E814 and UL1479.
- D. Systems or devices listed in the UL Fire Resistance Directory under category XHCR (firestop devices) and XHEZ (firestop systems) may be used, providing that they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system is symmetrical for wall applications.
- E. Accessories include, but are not limited to; permanent forming/damming/backing materials, temporary forming materials, substrate primers, and collars and steel sleeves.

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

#### **3.2 INSERTS**

- A. Provide inserts for placement in concrete formwork.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

#### **3.3 PIPE HANGERS AND SUPPORTS**

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Provide copper plated hangers and supports for copper piping.
- J. Design hangers for pipe movement without disengagement of supported pipe.
- K. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- L. Support piping from building structure. Do not support piping from other mechanical or electrical components.
- M. Do not support piping with wire or metal stripping hangers.

### **3.4 EQUIPMENT BASES AND SUPPORTS**

- A. Provide housekeeping pads of concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Provide for all floor mounted mechanical equipment.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

### **3.5 FLASHING**

- A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked 1 inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and calk, metal counterflash, and seal.
- C. Provide acoustical lead flashing around pipes penetrating equipment rooms, installed in accordance with manufacturer's instructions for sound control.

### **3.6 SLEEVES**

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors 1 inch above finished floor level. Sleeves in mechanical room floor slabs shall extend 6 inches above finished floor level. Calk sleeves.
- D. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with stuffing insulation and calk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

### **3.7 FIRE STOP SYSTEMS**

- A. Provide firestop systems for pipe and duct through-penetrations of the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items: floor and ceilings, walls and partitions, smoke barriers, and construction enclosed compartmentalized areas.
- B. Install through-penetration firestop systems to comply with manufacturer's written installation instructions.

### **3.8 SCHEDULES**

- A. Fire Protection Piping:
  - 1. Provide proper hangers and spacing according to the most current adopted N.F.P.A. 13 Standard.

**END OF SECTION**

**SECTION 22 05 00**  
**COMMON WORK RESULTS FOR PLUMBING**

**PART 1 GENERAL**

**1.1 WORK INCLUDES**

- A. Furnishing labor, materials, equipment and services required for the complete installation of new plumbing shown on the Drawings and specified in Division 22.
- B. All work shall be complete and shall be left in operating condition.
- C. Include all parts and labor, which are incidental and necessary for a complete and operable installation even though not specifically mentioned in the Contract Documents.
- D. Some equipment and materials provided under Division 21, 22, 23, 25 or Division 26 may require composite work crews because of trade jurisdiction. Where this occurs, include in the bid this portion of the composite crew labor costs. It is the Contractor's responsibility to review Division 21, 22, 23, 25 and Division 26 Contract Documents to determine where these composite crews are required.
- E. Obtain all temporary and permanent permits and licenses required in connection with this Division's work. Pay all fees and expenses required for such permits and licenses.
- F. Request inspections as required by regulating agencies and/or regulations. Pay all charges for inspections by regulating agencies of installations of plans specifications.
- G. Include State and Local sales taxes in the bid. Keep accurate records of these taxes and furnish such records to the Owner upon request.
- H. Provide the Owner with a certificate of final inspection and approval by enforcement authorities.
- I. Furnish labor, equipment, and materials required for cutting, demolition, removal, patching, and restoration work necessary to accomplish and complete all demolition, including any relocation or reuse of existing materials, equipment, systems, as well as the disposition of salvaged materials or debris.

**1.2 RELATED SECTIONS:**

- A. General Provisions are specifically applicable to all Division 22 Sections.
- B. Divisions **0 and 1** apply to all work of Division 22 and are an integral part of this Section. Where the conditions specified are at variance with other Divisions, Section 22 05 00 takes precedence. Section 22 05 00 specifies conditions, procedures, equipment and material particular to the mechanical work and applies to all mechanical work of the Contract Documents.
- C. Division **0 and 1** and Section 22 05 00 and all Addenda form a part of and apply to all contracts or sub-contracts relating to Division 22 work. Copy these documents to all Sub-contractors receiving other Sections of Division 22.
- D. Where a Specification Section refers to other Sections under the Article on "Related Sections", this is done for Contractor's convenience only. It shall in no way relieve the Contractor of responsibilities stated in other Sections of the Specifications, even though these Sections are not specifically referenced. The Contractor is responsible for all information contained in this Division's Specifications as well as for information contained in all other Divisions.

**1.3 WORK SEQUENCE**

- A. Coordinate all work of this Section with all subcontractors so the work will progress without interruption and without delays.

- B. Coordinate and schedule the work with the Owner and Construction Manager where possible disturbance may occur or where relocations or other potential disruptions of the Owner's functions and services are required. Perform all work affecting the Owner's functions and services at times acceptable to the Owner, even if this requires the Contractor to do the work in stages as directed by the Owner and Construction Manager.

#### **1.4 REGULATORY REQUIREMENTS**

- A. Meet or exceed all current applicable codes, ordinances and regulations for all installations. Promptly notify the Engineer, in writing, if the contract documents appear to conflict with governing codes and regulations. Contractor assumes all responsibility and costs for correcting non-complying work installed without notifying the Engineer.
- B. Higher quality of workmanship and materials indicated in the Contract Documents takes precedence over that allowed in referenced codes and standards.
- C. Perform all work in compliance with the currently adopted version of the following codes and standards for this project:

- Americans with Disabilities Act
- Municipal Water and Sewer Regulations
- National Electric Code
- NFPA 101 Life Safety Code
- Occupational Safety and Health Administration Regulations
- State and Local Building Codes
- State and Local Electrical Codes
- State and Local Fire Codes and Regulations
- State and Local Mechanical Codes
- State and Local Plumbing Codes
- State Industrial Commission Regulations
- State Elevator Code
- State Energy Code
- Uniform Federal Accessibility Standards
- AIA Guidelines

#### **1.5 REFERENCES**

- A. Use the Standard where referenced in the specifications by the following abbreviations:
  - AIA - American Institute of Architects
  - ANSI - American National Standards Institute
  - ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
  - ASME - American Society of Mechanical Engineers
  - ASTM - American Society of Testing and Materials
  - AWWA - American Water Works Association
  - EPA - Environmental Protection Agency
  - FM - Factory Mutual
  - IEEE - Institute of Electrical and Electronic Engineers
  - IES - Illuminating Engineering Society of North America
  - ICEA - International Cable Engineers Association
  - IRI - Industrial Risk Insurance
  - NEBB - National Environmental Balancing Bureau
  - NBFU - National Bureau of Fire Underwriters
  - NBS - National Bureau of Standards
  - NEMA - National Electrical Manufacturers Association
  - NFPA - National Fire Protection Association
  - NSC - National Safety Council
  - OSHA - Occupational Safety and Health Administration
  - PDI - Plumbing and Drainage Institute
  - SMACNA - Sheet Metal and Air Conditioning Contractors National Association



## 1.6 DEFINITIONS

- A. Contract Documents: References to Contract Documents refers to a complete set of Drawings and Specifications for the entire Project. Drawings and Specifications are intended to supplement one another. Provide items shown on the Drawings but not mentioned in the Specifications and items mentioned but not shown the same as if they were both mentioned and shown. Bid the most expensive interpretation of a conflict between Drawings and Specifications so the conflict can be resolved with a deduct rather than an add to the contract amount.
- B. Dimensions: Arrangement of equipment, accessories, piping and ductwork on the Drawings is generally diagrammatic unless the Drawings include dimensions. Do not scale the Drawings. Field verify all dimensions at the site to locate new and existing work.
- C. Furnish: To obtain, coordinate, submit the necessary drawings, deliver to the job site in new condition ready for installation, unload and unpack, and guarantee.
- D. Install: To receive at the job site, store, assemble, erect, set in place, anchor, apply, finish, protect, clean, test, start-up, and make ready for Owner's use.
- E. Provide: To furnish and install.
- F. Responsibility: Where verbs such as "furnish", "provide", "install", or "use" appear in the Contract Documents, they mean, "The Mechanical Contractor shall furnish, provide, install, or use....." unless the requirement is introduced by a phrase, sentence or heading specifically identifying the requirement as the responsibility of someone else.

## 1.7 SUBMITTALS

- A. Substitutions
  - 1. Submit written requests to use products not listed in the Specifications to the Engineer no later than ten (10) calendar days prior to the bid opening. Submit detailed information for proposed material or equipment.
  - 2. Accepted substitutions will be incorporated in an Addendum to the Contract Documents.
  - 3. Contractor is responsible for dimensional differences, weights, electrical requirements and any other resulting changes, when using equipment other than that scheduled on the Drawings. Contractor is responsible for any additional costs incurred as a result of substitutions, including other Contractors and Architect/Engineer fees.
  - 4. Material and equipment not listed in the Specifications or accepted in an Addendum will be removed and replaced at no cost or inconvenience to the Owner.
- B. List of Materials, Equipment and Sub-Contractors
  - 1. Submit a complete list of all materials, equipment, and sub-contractors, proposed to be used on this project, to the Engineer within seven (7) calendar days of the award of contract or written notice to proceed.
  - 2. Acceptance of items on the list are considered final, unless additional information or submissions are required by the Engineer. Unacceptable items will be rejected and resubmitted.
- C. Pay Request Cost Breakdown
  - 1. Provide Schedule of Values for the utilization of submitting a "Pay Request". Allocate appropriate share of overhead and profit to each item. Separate each item into labor and material.
  - 2. Submit cost breakdown on AIA document G703. Provide minimum breakdown as indicated below. Provide additional breakdown as required for clarity or as requested by the Engineer.

- a. Basic Materials and Methods
- b. Building Service Piping
- c. Plumbing Fixtures and Equipment

D. Submittals for Review

1. Submit in accordance with Division 0 and Division 1. Submit drawings to the Engineer for review within 30 calendar days after award of Contract.
2. Include project name, name of Architect, name of Engineer, contractor, sub-contractor, manufacturer, supplier and sales representative, include name, address, and phone number for the sales representative. Clearly identify section number and description of equipment submitted. Shop drawings not including all of this information will be returned without review.
3. Examine all shop drawings noting capacity, arrangement and physical dimensions. Clearly mark all relevant items on catalog data and cross-out unrelated information. Review and stamp shop drawing prior to submitting to the Engineer.
4. Submit a minimum of one PDF copy of each set of shop drawings based off of specification sections. The Engineer will distribute as follows:
  - a. Engineer - One (1) copy.
  - b. Architect - One (1) copy.
  - c. Remaining copies or red lined PDF copy shall be returned to the Architect, Construction Manager or General Contractor - (two copies to be incorporated into the O&M Manuals.
5. All shop drawings must be reviewed and accepted by the Engineer prior to fabrication and installation.
6. Submittals will be reviewed with the following actions:
  - a. NO EXCEPTIONS TAKEN—Indicates the Submittal appears to conform to the design concept of the Work and that the Contractor at his discretion, may proceed with fabrication and/or procurement and installation.
  - b. MAKE CORRECTIONS NOTED—Indicates that the Submittals, after noted corrections are made, would appear to conform to the design concept of the Work and that the Contractor, at his discretion, may proceed with fabrication and/or procurement and installation, if the corrections are accepted by the Contractor without an increase in Contract Sum or Time.
  - c. REJECTED—Indicates that the Submittal does not appear to conform to the specifications, and that a complete resubmittal is required. The Contractor shall not proceed with fabrication or procurement.
  - d. NO ENGINEER ACTION REQUIRED—Indicates the Contractor may proceed without review of the Submittal based on provisions of the Contract Documents.
7. Allow a minimum of fourteen (14) calendar days for the Engineer to review the shop drawings. Time is from the receipt of drawings in the Engineers office until they are shipped out of the office.
8. If the Engineer rejects (Make corrections noted/Submit corrected copy, Rejected/Submit specified item) two (2) times for the same section the Engineer will be compensated for the additional reviews. Compensation will be incorporated by Change Order and deducted from the Contractor's application for payment. Contractor is responsible for delays caused by the resubmittal process.

9. Submit shop drawings for the following equipment and systems:

<b>Section</b>	<b>Description</b>
22 05 23	General Duty Valves for Plumbing Piping
22 05 29	Hangers and Supports for Plumbing Piping and Equipment
22 05 53	Identification for Plumbing Piping and Equipment
22 07 16	Plumbing Equipment Insulation
22 07 19	Plumbing Piping Insulation
22 11 16	Domestic Water Piping
22 11 19	Domestic Water Piping Specialties
22 13 16	Sanitary Waste and Vent Piping
22 13 19	Sanitary Waste Piping Specialties
22 34 36	Commercial Gas Domestic Water Heaters
22 42 00	Commercial Plumbing Fixtures

### **1.8 CAD DRAWING FILES**

- A. The mechanical CAD drawing files prepared by Hallberg Engineering, Inc. for this project are Instruments of Service of Hallberg Engineering, Inc. for use solely with respect to this project and will not be made available to the Contractor.
- B. Request CAD drawing files of Architectural floor plans, elevations, sections, etc directly from the Architect.

### **1.9 QUALITY ASSURANCE**

- A. Regulatory Requirements:
  1. Initiate, maintain and supervise all safety precautions required with this work in accordance with the regulations of the Occupational Safety and Health Administration (OSHA) and other governing agencies.
- B. Environmental Requirements:
  1. Do not remove or disturb any asbestos containing materials from the project. Immediately stop work and notify the Owner if asbestos containing materials are suspected.
- C. Accomplish all work of cutting, removal, demolition, relocation, patching, and restoration by using only mechanics skilled in the trade required. Provide for the safety of the existing building and personnel, as well as for new construction as a result of work, procedures, operations or activities under this Contract.
- D. Where the work of removals, demolition, cutting and similar work involves structural considerations, consult with Engineer. Exercise extreme care to avoid damage and preserve the safety of the structure and of all personnel. Particular care must be taken where the demolition or removals occur adjacent to occupied areas.
- E. Utilize competent and qualified technical assistance to develop safe methods and techniques to accomplish the work, including temporary shoring and supports, methods of removal and other considerations. Design and place all permanent or temporary supports to carry all loads down to sound bearing.

### **1.10 PROJECT/SITE CONDITIONS**

- A. Site Inspections:
  1. Before submitting a proposal on the work contemplated, examine the site of the proposed work and become thoroughly familiar with existing conditions and limitations. No extra compensation will be allowed because of misunderstanding as to the amount of work involved nor bidders lack of knowledge of existing conditions which could have been discovered or reasonably anticipated prior to bidding.

2. Mechanical equipment and systems shown on the drawings as existing have been based on existing plans and may not be installed as originally shown. It is the contractors responsibility to visit the site and make exact determination of the existence, location and condition of such facilities prior to submitting a bid.

B. Correlation of Work:

1. Consult the drawings and specifications of Division 26 and other trades for correlating information and lay out work so that it will coordinate with other trades. Verify dimensions and conditions (i.e., finished ceiling heights, footing and foundation elevations, beam depths, etc.) with the Architectural and Structural drawings. Notify the Architect/Engineer of any conflicts that can not be resolved, in the field, by affected trades. Replacement of work due to lack of coordination and failure to verify existing conditions will be completed at no cost to the Owner.
2. Drawings may not show every rise and offset required for the work. Install piping and ductwork to accommodate the building structure and the work of other trades, with all required offsets and without extra cost to the Owner.
3. Where work must be replaced due to the failure of the Contractor to verify the conditions existing on the job, such replacement must be accomplished at no cost to the Owner. This applies to shop fabricated work as well as to work fabricated in place.
4. Throughout the course of the work, minor changes and adjustments to the installation may be requested by the Engineer. The Contractor shall make adjustments without additional cost to the Owner, where such adjustments are necessary to the proper installation and operation within the intent of the Contract Documents. This does not include work already completed.
5. Obtain exact location of connection to equipment, furnished by others, from the person furnishing the equipment.
6. Drawings and Specifications are complementary and what is called for in either is as binding as if called for in both.
7. Include the better quality, greater quantity or higher cost for an item or arrangement where a disagreement exists in the Drawings and Specifications.

**1.11 WARRANTY**

- A. Guarantee and maintain the stability of work and materials and keep same in perfect repair and condition for the period of one (1) year after the final completion of the work as evidenced by issuance of the final certificate by the Architect.
- B. Defects of any kind due to faulty work or materials appearing during the above mentioned period must be immediately made good by the Contractor at his own expense to the entire satisfaction of the Owner and Architect and Engineer. Include damage to the finish or the building resulting from the original defect or repairs.
- C. Guarantee does not apply to injuries occurring after final acceptance and due to wind, fire, violence, abuse or carelessness or other Contractors or their employees or the agents of the Owner.
- D. Guarantee does not apply where other guarantees for different lengths of time are specified in other Sections.

**1.12 ELECTRICAL**

- A. Magnetic starters, disconnects, and power wiring provided by the Electrical Contractor, unless otherwise specified.
- B. Control and interlock wiring provided by the Mechanical Contractor, unless otherwise specified.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURER'S, VENDORS, SUPPLIERS OR AGENTS**

- A. Provide only products and services from manufacturers, vendors, suppliers or agencies with local representation and listed in these specifications that can provide complete coverage, parts and labor, for replacement and service of their products and listed in these specifications. Provide only equipment that will fit in the space available and be completely serviceable. Bring any conflicts to the Engineer's attention prior to ordering the equipment. Wholesale suppliers are not considered manufacturer representative unless they can provide the services listed in these specifications.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Continuity of Service:
1. Coordinate/schedule all work with the Owner to minimize any disruptions. Confine all interruptions to the smallest possible area. Provide temporary connections if required to provide continuity of service.
  2. Inspect all areas affected by the interruptions and return all automatically controlled equipment, electrically operated equipment to the same operating condition prior to the interruption.
- B. Use of Facility:
1. Do not disturb normal use of the facility, except within the immediate construction area. Keep walks, driveways, entrances, etc. free and clear of equipment, material and debris.
  2. Store all equipment and material in a place and manner that minimizes congestion and is approved by the Owner.

### **3.2 DEMOLITION**

- A. The Drawings generally indicate the extent of demolition, removals, relocations and cutting.
- B. The Drawings are not to be construed as indicating all required work, nor indicating all conditions or details which might be encountered during progress of the work of this Contract.
- C. Examine all areas where demolition is to occur to determine the actual conditions and requirements.
- D. Provide temporary bracing, shoring, and support for the execution of the work and the protection of persons and property during demolition, cutting, remodeling and all related new construction under this Contract. Perform all work with appropriate supports, protection and methods to prevent collapse, settling or damage to property or persons. Provide adequate supports for the loads to be carried, properly distributed, to lower levels or to sound bearing, if necessary.
- E. Provide all protective coverings and enclosures necessary to prevent damage to existing spaces and materials which are to remain. Protect openings in exterior walls and roofs to prevent damage from water and weather and to prevent excessive heat loss from the existing buildings. Maintain a watertight installation by scheduling the work and removals at the exterior according to weather conditions. Temporarily seal unfinished areas to the existing roof or to other exterior surfaces of the existing building.

- F. Provide dustproof temporary enclosures (including above ceilings) to separate the areas under demolition and remodeling from the remainder of the building. Also provide temporary air filters and ductwork to keep construction dust contained within the construction area. Provide temporary hinged doors in temporary enclosures where necessary. Temporary and permanent doors shall be completely sealed with tape or other suitable materials during demolition work and shall remain sealed until the dust has settled.
- G. Demolish and remove existing construction as shown or indicated or as required to accomplish the work.
- H. Where new work is to be installed in or adjacent to existing construction or when existing work is to be replaced, remove or cut the existing construction as necessary to complete the work under the Contract.
- I. Execute the work with care. Remove and replace existing construction that is to remain which is loosened, cracked, or otherwise damaged or defaced, or is rendered unsuitable for its intended use, as a result of the work at no additional cost to the Owner.
- J. Clean demolition areas and remove debris, waste and rubbish from the building at the conclusion of each day's work. Transport debris and rubbish in a manner that prevents the spread of dust. Do not store or permit debris storage at the site. Do not burn or permit the burning of debris, rubbish or waste at the site. Keep adjacent areas unencumbered and clean. Keep all construction areas essentially broom clean.
- K. Abandoned services may be left in place where they will be concealed inside floors or walls, providing they are disconnected from their sources and capped in place. No abandoned services, including piping, ductwork, tubing, etc., in ceilings or exposed.
- L. Assure no "dead end" water, sewer, or vent piping is left in the completed work.
- M. Based on a site inspection and the Contract Documents, the Contractor is responsible for the removal or rerouting of all anticipated mechanical work, exposed and concealed.
- N. Where unanticipated mechanical work is exposed during the removal of partitions, walls, floors or ceilings, the removal or rerouting of this work shall be accomplished by the Contractor under the direction of the Engineer.
- O. Patch or otherwise restore disturbed existing construction and surfaces. Patching or restoration shall be carried to natural breaks. Where existing construction is removed, cut or otherwise disturbed, patch all such disturbed and damaged surfaces.
- P. Perform patching work by skilled mechanics experienced in the particular type of work involved. Conform to the standards of the Specifications where applicable, and where not specified, conform to the highest standards of the trade.
- Q. Patch existing construction to match existing work, but always provide new materials and accomplish the work according to current standards. Examine existing surfaces before proceeding with the work. Report all conditions to the engineer, architect or owner, where existing materials, colors and finishes cannot be matched, but do not proceed until receiving instructions.
- R. Repair existing construction that has been damaged as a result of the work to the extent required to match existing, undamaged construction.
- S. All holes created by removal of existing systems, piping, ductwork, control wiring, tubing, etc., shall be patched and fire caulked.

### **3.3 INSTALLATION**

#### **A. Material and Workmanship**

- 1. Provide new material and equipment, unless noted otherwise. Protect equipment and material from damage, dirt and the weather.

2. Provide the highest quality workmanship and perform all work only by skilled mechanics. Install material and equipment in accordance with manufacturers' recommendations, instructions and current standards.
3. The Engineer reserves the right to reject material or workmanship not in accordance with the Contract Documents, before or after installation.

B. Piping

1. All piping shall be run in the most direct and straight manner possible maintaining proper grading.
2. It is the intent of these plans and specifications that most piping be concealed. Where exposed, run as close to ceiling and/or wall as possible parallel with adjacent structural or architectural elements.
3. Do not install piping in any switchgear, transformer, elevator equipment, telephone, or electrical equipment room, unless it is a branch serving that room.
4. Do not install piping above switchboards, panelboards, control panels, motor control centers, etc.
5. Arrange work to facilitate maintenance, repair or replacement of equipment. Provide access for devices that require maintenance. For concealed devices, verify that access panels are properly located and labeled.

C. Equipment:

1. Install material and equipment in accordance with the Manufacturer's written instructions.

D. Cutting and Patching:

1. Perform all cutting and patching necessary to work, unless specifically delegated to the General Contractor. Obtain special permission from the engineer before cutting structural members or finished material. Perform all patching in such a manner as to leave no visible trace and return the area affected to the condition of undisturbed work. Perform all patching by workers experienced, skilled, and licensed for the particular type of work involved. Inferior work will not be accepted.
2. Patch all holes left as a result of demolition of mechanical equipment and devices.
3. Drill all holes in masonry with rotary drill. Impact tools are not allowed. Core drill all holes in masonry and concrete for mechanical penetrations. Provide and dispose of all water required for core drilling. Coordinate with other trades to prevent damage from water.
4. Prevent the spread of dust, debris, and other material into adjacent areas.
5. Replace all ceiling tiles damaged during installation of work, with new tile.

E. Painting:

1. Refinish all mechanical equipment damaged during shipping and/or installation to its original condition. Remove all rust; prime, and paint per manufacturer's recommendations for finish equal to original.

F. Record Drawings:

1. Provide Record Drawings in accordance with the requirements of Division 0 and Division 1.
2. Maintain a complete set of Record Drawings showing all modifications to the Contract Documents. Drawings will be stamped "Record Drawings" and used only for that purpose.
3. As work progresses, record all changes or deviations from the contract drawings in a neat and legible manner as follows:

- a. Record exact location and elevation of underground mechanical systems including changes in direction, cleanouts etc., by reference to building lines, curbs, walks, and other permanent reference points.
  - b. Record routing of concealed and exposed above ground mechanical systems where it varies from the Contract Documents.
4. The Engineer may recommend withholding payment if Record Drawings are not being maintained.
  5. Submit Record Drawings to the Engineer for review at completion of the Work. Submit final record drawings as part of the Operation and Maintenance Manual package after the completion of the project.

### **3.4 TEMPORARY UTILITIES**

- A. Do not use heating, ventilating and air conditioning systems provided in this scope of work for temporary heating, ventilating and air conditioning during construction.

### **3.5 PROTECTION**

- A. Protect openings and equipment from obstruction, breakage, misuse, damage or blemishes. Protect materials and equipment immediately upon receipt at the job site or immediately after they have been removed from their shipping containers. Unless noted otherwise, keep them clean and undamaged until final acceptance of the entire Project by the Owner. When a portion of the building is occupied by the Owner before substantial completion of the entire Project, make arrangements to transfer responsibility for protection and housekeeping for the occupied portion.
- B. Protect pipe and equipment openings with temporary plugs or caps. Keep openings covered until permanent connections are complete.
- C. Contractor is responsible for any damage to mechanical equipment, materials or work until final acceptance of the entire project by the Owner.

### **3.6 CLEAN UP**

- A. Keep the premises free from accumulation of waste material or rubbish, caused by his employees or work, at all times. Remove rubbish, tools, scaffolding, and surplus materials from and about the building, and leave work areas "broom clean" or its equivalent upon completion of the work. Clean mechanical equipment and remove temporary identification.
- B. In case of dispute, the Owner will remove the rubbish and charge the cost to the Contractor.

### **3.7 START-UP**

- A. Before start-up, lubricate, charge, and fill systems as specified and according to Manufacturer's instructions.
- B. Test plumbing systems as specified in Sections governing their installation.
- C. Perform testing, adjusting and balancing in accordance with that Section.
- D. Operate equipment and systems in all their operating modes, to verify proper operation, prior to final field observation and Owner instructions. Notify the Engineer, in writing, that all systems have been tested and are functioning and operating properly.

### **3.8 FINAL FIELD OBSERVATION**

- A. A final field observation of the mechanical systems will be required before Contract Closeout. Request a final observation by the Engineer after all systems are fully completed and operational. The Engineer will schedule a field observation and generate a list of items to be corrected or completed before Contract Closeout.



- B. If the Engineer is requested to make a final field observation by the Contractor, and the Engineer finds the work is not complete enough to perform that observation, the Contractor will compensate the Engineer for their time. The Contractor will then perform the necessary work to complete the project and again request a Final Field Observation.

### **3.9 TRAINING**

- A. Fully instruct the Owner's designated personnel in the operation of each mechanical system at the time it is put into service. Provide instruction using competent instructors and factory trained personnel.
- B. Include documentation of instructions in the Operation and Maintenance Manuals.
- C. Obtain a written statement from the Owner that his designated personnel have been instructed.

### **3.10 UTILITY REBATES**

- A. This Contractor shall secure on behalf of the Owner all utility rebates associated with the design. This shall include all submittals to the utility companies including substantiation where required and making all necessary arrangements on behalf of the Owner.

### **3.11 PROJECT CLOSEOUT**

- A. Operating and Maintenance Manuals: Submit to the Engineer two (2) Operating and Maintenance manuals. Submit in portfolio form neatly edited with similar equipment grouped, tabbed and indexed. Provide printed or typewritten materials. Provide the following in each manual:
  - 1. Shop drawings, approved manufacturer's bulletins, and other appropriate data from specific manufacturer of each piece of equipment furnished and/or installed. Shop drawings, manufacturer's bulletin, and other data shall be appropriate marked to reflect the "as-built" condition. Cross out or delete all information shown on shop drawings or literature not applying to this specific project.
  - 2. Copies of manufacturer's warranties
  - 3. Operating instruction for equipment.
  - 4. Wiring and installation instructions for equipment.
  - 5. Recommended maintenance schedules and procedures for equipment.
  - 6. Recommended trouble shooting procedures for equipment.
  - 7. Equipment parts list.
  - 8. Settings/adjustments/calibrations for systems as required.
  - 9. Local equipment suppliers/ reps names, addresses, and telephone numbers.
  - 10. Equipment manufacturers names, addresses, and telephone numbers.
  - 11. Sub-contractors names, addresses, and telephone numbers.
  - 12. Test reports.
  - 13. Certifications.
  - 14. Test and balance reports.
  - 15. System validation reports.
  - 16. Statement from Contractor that all incomplete items noted in Engineer's Final Field Observation Report have been completed.
  - 17. Statement from Owner confirming completion of Training.
  - 18. Refer to individual Sections in Division 22 for additional requirements.
- B. Record Drawings: Submit Record Drawings.

- C. Extra Materials: Refer to individual Specification Sections for extra materials to be provided to the Owner.
- D. System Startup: Refer to individual Specification Sections for system startup requirements.

**END OF SECTION**

**SECTION 22 05 23**  
**GENERAL DUTY VALVES FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Valves for plumbing piping systems.
  - 1. Ball.
  - 2. Check.
  - 3. Drain.
  - 4. Ball (fuel).

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 05 53 – Identification for Plumbing Piping and Equipment.
- C. Section 22 11 16 – Domestic Water Piping.

**1.3 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 22 05 00.
- B. Product Data: Provide data on valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

**1.4 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Submit under provisions of Section 22 05 00.
- B. Project Record Documents: Record actual locations of valves.

**1.5 QUALITY ASSURANCE**

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Welding Materials and Procedures: Conform to ASME SEC IX and applicable state labor regulations.
- C. Welders Certification: In accordance with ASME SEC IX.

**1.6 REGULATORY REQUIREMENTS**

- A. Perform Work in accordance with State and Municipal plumbing code.

**1.7 DELIVERY, STORAGE, AND PROTECTION**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.

**1.8 EXTRA MATERIALS**

- A. Furnish under provisions of Section 22 05 00.
- B. Provide two repacking kits for each size valve.

**PART 2 PRODUCTS**

**2.1 BALL VALVES - (150 PSIG)**

- A. Up to and including 2 inches:  
R21-4133.000 – Safe Haven Women's  
Shelter

1. Manufacturer: Apollo 77-140/77-240 Series, or equivalent by:
  - a. Hammond.
  - b. Kitz.
  - c. Milwaukee.
  - d. Nibco.
  - e. Watts.
  - f. Substitutions: Refer to Section 22 05 00.
2. Construction: Class 150, 600 psig wog, bronze, two piece body, stainless steel ball, full port, teflon seats and stuffing box ring, brass blow-out proof stem, lever handle, solder or threaded ends with union. Stainless steel stem and nut. Extended stems for use on insulated pipe.

## **2.2 SWING CHECK VALVES - (150 PSIG)**

- A. Up To and Including 2 1/2 inches:
  1. Manufacturers: Stockham Model B-309/B-319, or equivalent by:
    - a. Hammond.
    - b. Kitz.
    - c. Milwaukee.
    - d. Nibco.
    - e. Watts Regulator.
    - f. Substitutions: Refer to Section 22 05 00.
  2. Class 125, bronze body and cap, bronze swing disc with rubber seat, solder or threaded ends.

## **2.3 BALL VALVES - NATURAL GAS**

- A. Manufacturer:
  1. Apollo.
  2. Hammond.
  3. Kitz.
  4. Milwaukee.
  5. Nibco.
  6. Watts.
  7. Substitutions: Refer to Section 22 05 00.
- B. Construction 3/8" to 3": UL Listed for valves, Class 150, 600 wog for valves installed on systems over 5 psi. AGA Standard 3-88, ANSI Z21.15, CGA9.1 and CR91-002 for valves installed on systems 5 psi and less. Bronze body, chrome plated brass ball, Virgin PTFE (Teflon) seats and stem bearing, reinforced PTFE (15% glass Teflon) stem packing, lever handle, threaded ends, one quarter turn on/off and blow-out proof stem.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of existing conditions before starting work.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide access where valves and fittings are not exposed.
- C. Install valves with stems upright or horizontal, not inverted.

### **3.3 APPLICATION**

- A. Use ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- B. Use globe valves for throttling, bypass, or manual flow control services.
- C. Use plug cocks for throttling service. Use non-lubricated plug cocks only when shut-off or isolating valves are also provided.
- D. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- E. Use 3/4 inch ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment. Pipe to nearest floor drain.
- F. Provide spring loaded check valves on discharge of water pumps.
- G. Provide ball valves or plug valves in natural gas systems for shut-off service.

**END OF SECTION**



## **SECTION 22 05 29**

### **HANGERS & SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Pipe hangers, equipment hangers and supports.
- B. Equipment bases and supports.
- C. Sleeves and seals.
- D. Flashing and sealing equipment and pipe stacks.

##### **1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 07 19 – Plumbing Piping Insulation
- C. Section 22 11 16 – Domestic Water and Gas Piping.

##### **1.3 REFERENCES**

- A. ASME B31.9 - Building Services Piping

##### **1.4 SUBMITTALS**

- A. Shop Drawings: Indicate system layout with locations and details of all types of hangers.
- B. Product Data: Provide manufacturers catalog data including load capacity.
- C. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.
- D. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

##### **1.5 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for support of plumbing piping.

#### **PART 2 PRODUCTS**

##### **2.1 PIPE HANGERS AND SUPPORTS**

- A. Manufacturers:
  - 1. Anvil.
  - 2. B-Line Systems.
  - 3. Michigan.
  - 4. Tolco.
  - 5. Substitutions: Under provisions of Section 22 05 00.
- B. Plumbing Piping - DWV:
  - 1. Conform to ASME B31.9.
  - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, and split ring.
  - 3. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
  - 4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

5. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

C. Plumbing Piping – Water and Gas:

1. Conform to ASME B31.9.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, and split ring.
3. Hangers for Cold Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
6. Vertical Support: Steel riser clamp.
7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Floor Support for Hot Pipe Sizes to 4 inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## 2.2 HANGER RODS

- A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

## 2.3 FLASHING

- A. Metal Flashing: 26 gage thick galvanized steel.
- B. Metal Counterflashing: 22 gage thick galvanized steel.
- C. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- D. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

## 2.4 SLEEVES

- A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage thick galvanized steel.
- B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.
- D. Sleeves for Pipes in building walls below grade: modular wall seal.
- E. Stuffing and Fire stopping Insulation: Glass fiber type, non-combustible.
- F. Sealant: Acrylic.

## 2.5 FIRESTOP SYSTEMS

- A. Manufacturer:
1. 3M (Minnesota Mining and Manufacturing Co.).
  2. Hilti.
  3. Substitutions: Under provisions of Section 22 05 00.



- B. Firestop systems that are produced and installed to resist the spread of fire according to requirements indicated, resist passage of smoke and other gasses, and maintain original fire-resistance rating of construction assembly.
- C. Certificate of conformance for through-penetration requirements of ASTM E814 and UL1479.
- D. Systems or devices listed in the UL Fire Resistance Directory under category XHCR (firestop devices) and XHEZ (firestop systems) may be used, providing that they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system is symmetrical for wall applications.
- E. Accessories include, but are not limited to; permanent forming/damming/backing materials, temporary forming materials, substrate primers, and collars and steel sleeves.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

### **3.2 PIPE HANGERS AND SUPPORTS**

- A. Support horizontal piping as scheduled.
- B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each joint.
- F. Support vertical piping at every floor.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Provide copper plated hangers and supports for copper piping.
- J. Design hangers for pipe movement without disengagement of supported pipe.
- K. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- L. Hangers for insulated pipe shall be large enough to encompass the insulation and the metal protective shield, except that hangers may be applied directly to the pipe for domestic hot water and rainwater piping.
- M. Support piping from building structure. Do not support piping from other mechanical or electrical components.
- N. Do not support piping with wire or metal stripping hangers.

### **3.3 EQUIPMENT BASES AND SUPPORTS**

- A. Provide housekeeping pads of concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Provide for all floor mounted mechanical equipment.
- B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed.

### 3.4 FLASHING

- A. Provide flexible flashing and metal counterflashing where piping penetrate weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked 1 inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and calk, metal counterflash, and seal.
- C. Seal floor and shower drains watertight to adjacent materials.
- D. Adjust storm collars tight to pipe with bolts; calk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

### 3.5 SLEEVES

- A. Set sleeves in position in formwork. Provide reinforcing around sleeves.
- B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- C. Extend sleeves through floors 1 inch above finished floor level. Sleeves in mechanical room floor slabs shall extend 6 inches above finished floor level. Calk sleeves.
- D. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with stuffing insulation and caulk air tight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- E. Install chrome plated steel escutcheons at finished surfaces.

### 3.6 FIRE STOP SYSTEMS

- A. Provide firestop systems for pipe through-penetrations of the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items: floor and ceilings, walls and partitions, smoke barriers, and construction enclosed compartmentalized areas.
- B. Install through-penetration firestop systems to comply with manufacturer's written installation instructions.

### 3.7 SCHEDULES

A. Piping:

PIPE SIZE Inches	MAX. HANGER SPACING Feet	HANGER ROD DIAMETER Inches
1/2 to 1-1/4	6	3/8
1-1/2 to 2	8	3/8
PVC (All Sizes)	4	3/8
C.I. No-Hub and at Joints	5*	3/4

\* Support cast iron at every other joint unless over 4 feet, then support each joint not to exceed 10 feet.

**END OF SECTION**

**SECTION 22 05 53**  
**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Nameplates.
- B. Tags.
- C. Pipe Markers.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.

**1.3 REFERENCES**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 22 05 00.
- B. Product Data: Provide manufacturers catalog literature for each product required.
- C. Manufacturer's Instructions: Indicate installation instructions, special procedures, and installation.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 22 05 00: Procedures for submittals.
- B. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

**1.6 REGULATORY REQUIREMENTS**

- A. Conform to ANSI/OSHA.

**PART 2 PRODUCTS**

**2.1 NAMEPLATES**

- A. Manufacturers:
  - 1. Seton.
  - 2. Brady.
  - 3. Substitutions: Refer to Section 22 05 00.
- B. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

**2.2 TAGS**

- A. Plastic Tags:
  - 1. Manufacturers:
    - a. Seton.
    - b. Brady.
    - c. Substitutions: Refer to Section 22 05 00.

2. Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inches diameter.

### **2.3 PIPE MARKERS**

- A. Color and Lettering: Conform to ASME A13.1.
- B. Pipe Markers:
  1. Manufacturers:
    - a. Brady.
    - b. Seton.
    - c. Substitutions: Refer to Section 22 05 00.
  2. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. No tape or adhesive necessary. Larger sizes may have maximum sheet size with spring fastener.
- C. Plastic Underground Pipe Markers:
  1. Manufacturers:
    - a. Markline.
    - b. Substitutions: Refer to Section 22 05 00.
  2. Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.

### **3.2 INSTALLATION**

- A. Install identifying devices after completion of coverings and painting.
- B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.
- C. Install labels with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.
- D. Install tags and signs using corrosion resistant chain. Number tags consecutively by location.
- E. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- F. Identify pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- G. Identify control panels and major control components outside panels with plastic nameplates.
- H. Identify valves in main and branch piping with tags.
- I. Tag automatic controls, instruments, and relays. Key to control schematic.
- J. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

### **3.3 SCHEDULES**

#### **A. Identification:**

1. Piping: Use pipe service description and color schemes that are standard to the manufacturer.
2. Equipment: Use nomenclature as noted on the drawings.
3. Underground Utilities: Use nomenclature as noted on the drawings.

**END OF SECTION**



**SECTION 22 07 19**  
**PLUMBING PIPING INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and accessories.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 05 53 – Identification for Plumbing Piping and Equipment.
- C. Section 22 11 16 – Domestic Water Piping: Placement of hangers.

**1.3 REFERENCES**

- A. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
- B. ASTM C547 - Standard Specification for Mineral Fiber Preformed Pipe Insulation.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. NAIMA National Insulation Standards.
- E. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 22 05 00.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years documented experience approved by manufacturer.

**1.6 REGULATORY REQUIREMENTS**

- A. Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E84, NFPA 255 and UL 723.
- B. Conform to ASTM Standards for “k” value, moisture vapor transmission, maximum moisture absorption, jacket, insulating cement, and adhesive.

**1.7 DELIVERY, STORAGE, AND PROTECTION**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

**1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

## **PART 2 PRODUCTS**

### **2.1 GLASS FIBER**

- A. Manufacturer: Owens-Corning – Evolution.
- B. Other acceptable manufacturers offering equivalent products:
  - 1. CertainTeed
  - 2. Knauf
  - 3. Johns Manville
  - 4. Substitutions: None.
- C. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
  - 1. 'K' value: ASTM C177, 0.24 at 75° F.
  - 2. Maximum service temperature: 850° F.
  - 3. Maximum moisture absorption: 0.2% by volume.
- D. Vapor Barrier Jacket:
  - 1. White paper free ASJ film.
  - 2. Moisture vapor transmission: 0.02 perm-inches.
- E. Tie Wire: 0.048" stainless steel with twisted ends on maximum 12" centers.
- F. Vapor Barrier Lap Adhesive:
  - 1. Compatible with insulation.
- G. Fibrous Glass Fabric:
  - 1. Blanket: 1.0 ob/cu ft density.
  - 2. Weave: 10x10.
- H. Indoor Vapor Barrier Finish:
- I. Vinyl emulsion type acrylic, compatible with insulation, white color.

### **2.2 CELLULAR FOAM**

- A. Manufacturer: Armstrong AP.
- B. Other acceptable manufacturers offering equivalent products:
  - 1. Halstead.
  - 2. IMCOA/Nomaco.
  - 3. Rubatex.
  - 4. Substitutions: Refer to Section 22 05 00.
- C. Insulation: ASTM C534; flexible, cellular elastomeric (or unicellular polyolefin), molded or sheet.
  - 1. 'K' Value: 0.27 at 75 degrees F.
  - 2. Minimum Service Temperature: -40 degrees F.
  - 3. Maximum Service Temperature: 220 degrees F.
  - 4. Maximum Moisture Absorption: 5 percent by weight.
  - 5. Moisture Vapor Transmission: 0.10 perm-inches.



6. Connection: Waterproof vapor barrier adhesive.

D. Adhesive: Air dried, contact adhesive, compatible with insulation.

## **2.3 JACKETS**

A. PVC Plastic:

1. Manufacturers:
  - a. Zeston.
  - b. Substitutions: Refer to Section 22 05 00.
2. Jacket: Sheet material, off-white color.
  - a. Minimum Service Temperature: -40 degrees F.
  - b. Maximum Service Temperature: 150 degrees F.
  - c. Moisture Vapor Transmission: 0.002 perm-inches.
  - d. Thickness: 10 mil minimum (use standard stock dimensions).
  - e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic:
  - a. Compatible with insulation.

B. Aluminum Jacket:

1. Thickness: .025" sheet.
2. Finish: Smooth.
3. Joining: Longitudinal slip joints and 2" laps.
4. Metal Jacket Bands: 3/8" wide; 0.015" thick aluminum.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### **3.2 INSTALLATION**

- A. Install in accordance with NAIMA National Insulation Standards.
- B. Exposed Piping: Locate insulation and cover seams in least visible locations.
- C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- D. Glass fiber insulated pipes conveying fluids below ambient temperature:
  1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- E. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- F. Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

G. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.
4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

H. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 22 05 29.

I. Pipe Exposed in finished, occupied paces: Finish with PVC jacket and fitting covers.

J. Piping in Mechanical and storage rooms: finish with aluminum jacket below 6'-0" AFF.

### 3.3 SCHEDULES

A. Plumbing Systems:

1. Domestic Hot Water Supply and Recirculation:
  - a. Glass Fiber Insulation:
    - 1) Pipe Size Range: 2 inch and less, 2-1/2 inch and larger.
    - 2) Thickness: 1 inch, 1-1/2 inch.
2. Plumbing Vents Within 10 feet of the Exterior:
  - a. Glass Fiber Insulation:
    - 1) Thickness: 1/2 inch.
3. Domestic Cold Water:
  - a. Glass Fiber Insulation:
    - 1) Pipe Size Range: all sizes.
    - 2) Thickness: 1".
  - b. Cellular Foam Insulation (Water service piping up to 6'-0" AFF).
    - 1) Thickness: 3/4".
4. Drains from Water Coolers (Minimum 10 feet):
  - a. Cellular Foam Insulation.
    - 1) Thickness: 3/4".

**END OF SECTION**

**SECTION 22 11 16**  
**DOMESTIC WATER AND GAS PIPING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Pipe, pipe fittings, connections, and testing for piping systems.
  - 1. Domestic water.
  - 2. Natural gas.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment.
- C. Section 22 05 53 – Identification for Plumbing Piping and Equipment.
- D. Section 22 07 19 – Plumbing Piping Insulation.
- E. Section 22 05 23 – General Duty Valves for Plumbing Piping.

**1.3 REFERENCES**

- A. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- B. UL 1479 - Fire Tests of Through-Penetration Firestops.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 22 05 00.
- B. Product Data: Provide data on pipe materials, pipe fittings, and accessories. Provide manufacturers catalog information.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Submit under provisions of Section 22 05 00.
- B. Project Record Documents: Record actual routing of piping.
- C. Piping system cleaning reports.
- D. Piping system testing reports.

**1.6 QUALITY ASSURANCE**

- A. Testing of all piping systems.
- B. Welding Materials and Procedures: Conform to ASME SEC IX and applicable state labor regulations.
- C. Welders Certification: In accordance with ASME SEC IX.
- D. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

**1.7 REGULATORY REQUIREMENTS**

- A. Perform Work in accordance with State and Municipal plumbing code.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

## **1.8 DELIVERY, STORAGE, AND PROTECTION**

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install underground piping when bedding is wet or frozen.

## **PART 2 PRODUCTS**

### **2.1 WATER PIPING (ABOVE GRADE)**

- A. Copper Tubing: ASTM B88, Type L, hard drawn, ½" to 4".
  - 1. Fittings: Cast copper alloy or wrought copper and bronze.
  - 2. Joints: 95/5 solder, except joints shall be brazed at expansion loops.

### **2.2 NATURAL GAS PIPING (ABOVE GRADE)**

- A. Steel Pipe: ASTM A53 Schedule 40 black. 2 inch and smaller exposed.
  - 1. Fittings: Malleable iron.
  - 2. Joints: Threaded.
- B. Steel Pipe: ASTM A53 Schedule 40 black. 2 inch and smaller concealed, and 2 ½ inch and larger.
  - 1. Fittings: Forged steel welding type.
  - 2. Joints: Welded.

### **2.3 NATURAL GAS PIPING (BELOW GRADE IN SLEEVE)**

- A. Copper Tubing: ASTM B388, Type K soft copper, seamless.
  - 1. Fittings: Cast bronze or cast copper alloy or wrought copper and bronze.
  - 2. Joints: BCuP silver braze. (No joints with in buried sleeve).

### **2.4 FLANGES, UNIONS, AND COUPLINGS**

- A. Pipe Size 3 inches and Under:
  - 1. Ferrous pipe: Class 150 malleable iron threaded unions.
  - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Pipe Size Over 1 inch:
  - 1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  - 2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, or Victaulic Clearflow dielectric waterway, water impervious isolation barrier.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of existing conditions before starting work.
- B. Verify that excavations are to required grade, and not over-excavated.

### **3.2 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 05 29.
- H. Provide access where fittings are not exposed.
- I. Establish elevations of buried piping outside the building to ensure not less than 8 ft of cover.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Provide support for utility meters in accordance with requirements of utility companies.
- L. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
- M. Pipe relief valves full size to 12 inches above floor, run to floor drain if within 20 feet.
- N. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- O. Install water piping to ASME B31.9.
- P. Sleeve pipes passing through partitions, walls and floors.
- Q. Pipe Hangers and Supports: Refer to Section 22 05 29.
- R. Provide tracer wire with all underground natural gas pipe.
- S. Provide PVC sleeve for all underground gas piping within the building.

### **3.4 APPLICATION**

- A. Provide unions downstream of valves and at equipment or apparatus connections.
- B. Provide brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Provide flow controls in all branches of water recirculating systems.

### **3.5 ERECTION TOLERANCES**

- A. Slope water piping minimum 0.25 percent and arrange to drain at low points.

### **3.6 TESTING OF PLUMBING SYSTEMS**

- A. Provide final test with fixtures in place with 1 inch water column air pressure.
- B. Test domestic water piping, tanks, etc. with hydraulic pressure of 125 psig for a period of 2 hours.

### **3.7 TESTING OF GAS PIPING**

- A. Test gas piping at 50 psig for 24 hours with no drop in pressure as dictated by local codes or Gas Co. if greater. Soap test all joints.

### **3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

### **3.9 SERVICE CONNECTIONS**

- A. Provide a gas service from house side of relocated gas meter and regulator. Verify with Gas Utility Company that the new gas meter and regulator is adequate size. Gas service distribution piping to have initial minimum pressure 2 psig. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment. All regulators to be compatible with LP gas and natural gas.

**END OF SECTION**

**SECTION 22 11 19**  
**DOMESTIC WATER PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Water hammer arrestors.
- B. Relief valves.
- C. Water pressure reducing valves.
- D. Strainers.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 11 16 – Domestic Water Piping.
- C. Section 22 11 23 – Domestic Water Pumps.
- D. Section 22 42 00 – Commercial Plumbing Fixtures.

**1.3 REFERENCES**

- A. ASME A112.26.1 - Water Hammer Arrestors.
- B. ASSE 1011 - Hose Connection Vacuum Breakers.
- C. ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
- D. PDI WH-201 - Water Hammer Arrestors.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under the provisions of Section 22 05 00.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- D. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 22 05 00 - Warranties.
- B. Project Record Documents: Record actual locations of all water piping specialties.
- C. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

**1.7 DELIVERY, STORAGE, AND PROTECTION**

- A. Accept specialties on site in original factory packaging. Inspect for damage.

**PART 2 PRODUCTS**

**2.1 WATER HAMMER ARRESTORS**

- A. Manufacturer: Josam 75000.  
R21-4133.000 – Safe Haven Women's  
Shelter

- B. ANSI A112.26.1; stainless steel construction, bellows type sized in accordance with PDI WH-201, precharged suitable for operation in temperature range 100 to 300 degrees F and maximum 150 psi working pressure.

## **2.2 RELIEF VALVES**

### **A. Temperature and Pressure Relief:**

1. Manufacturers: Watts Type 40, or equivalent by:
  - a. Bell & Gossett.
  - b. Kunkle
  - c. Substitutions: Refer to Section 22 05 00.
2. AGA Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME SEC IV certified and labeled.

## **2.3 WATER PRESSURE REDUCING VALVES**

### **A. Up to 2 inches:**

1. Manufacturers: Watts Series U5, or equivalent by:
  - a. Amtrol.
  - b. Substitutions: None.
2. Construction: Bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded double union ends, with integral stainless steel strainer.

### **B. Over 2 inches:**

1. Manufacturers:
  - a. Watts.
  - b. Amtrol.
  - c. Substitutions: None.
2. MSS SP-85, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

## **2.4 STRAINERS**

### **A. Manufacturers:**

1. Armstrong.
2. Hayward.
3. Metra-Flex.
4. Mueller.
5. Sarco.
6. Titan.
7. Watts.
8. Substitutions: Refer to Section 22 05 00.

- ### **B. Size 2 inch and Under:** Threaded brass body for 200 psig wog, Y pattern with 20 mesh stainless steel perforated screen. Application: Bronze body with copper or brass pipe.



## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; janitor rooms, flush valves, interior and exterior hose bibs.
- C. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories and water closets.

**END OF SECTION**



**SECTION 22 13 16**  
**SANITARY WASTE AND VENT PIPING**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

A. Pipe, pipe fittings, connections, and testing for system.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 05 29 - Hangers and Supports for Plumbing Piping and Equipment.
- C. Section 22 05 53 – Identification for Plumbing Piping and Equipment.
- D. Section 22 07 19 – Plumbing Piping Insulation.
- E. Section 22 05 23 – General Duty Valves for Plumbing Piping.

**1.3 REFERENCES**

- A. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- B. ASTM C564 – Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- C. ASTM C1540 – Heavy Duty Shielded Couplings for Hubless Cast Iron.
- D. ASTM D2665 - Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
- E. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.
- F. UL 723 – Molded Plastic Surface Burning Characteristics.
- G. UL 1479 - Fire Tests of Through-Penetration Firestops.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 22 05 00.
- B. Product Data: Provide data on pipe materials, pipe fittings, and accessories. Provide manufacturers catalog information.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Submit under provisions of Section 22 05 00.
- B. Project Record Documents: Record actual routing of piping.
- C. Piping system cleaning reports.
- D. Piping system testing reports.

**1.6 QUALITY ASSURANCE**

- A. Testing of all piping systems.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, water pressure rating.

**1.7 REGULATORY REQUIREMENTS**

- A. Perform Work in accordance with State and Municipal plumbing code.

**1.8 DELIVERY, STORAGE, AND PROTECTION**

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install underground piping when bedding is wet or frozen.

## **PART 2 PRODUCTS**

### **2.1 SANITARY WASTE AND VENT PIPING (BELOW GRADE)**

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron.
  - 2. Heavy duty joints: Neoprene gasket and stainless steel clamp and shield assemblies conforming to ASTM C1540.
    - a. Manufacturers: Husky, Clamp-All, Tyler, Mission Coupling.
- B. PVC Pipe: ASTM D2665, Schedule 40.
  - 1. Fittings: PVC, Schedule 40.
  - 2. Joints: Solvent weld with solvent cement and primer.
  - 3. Install per ASTM D2321.

### **2.2 SANITARY WASTE AND VENT PIPING (ABOVE GRADE)**

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron.
  - 2. Heavy duty joints: Neoprene gasket and stainless steel clamp and shield assemblies conforming to ASTM C1540.
    - a. Manufacturers: Husky, Clamp-All, Tyler, Mission Coupling.
- B. PVC Pipe: ASTM D2665
  - 1. Fittings: PVC.
  - 2. Joints: Solvent weld with solvent cement.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verification of existing conditions before starting work.
- B. Verify that excavations are to required grade, dry, and not over-excavated.

### **3.2 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- C. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- D. Group piping whenever practical at common elevations.

- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 05 16.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 05 29.
- G. Provide access where fittings are not exposed.
- H. Establish elevations of buried piping outside the building to ensure not less than 8 ft of cover.
- I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
- L. Sleeve pipes passing through partitions, walls and floors.
- M. Pipe Hangers and Supports: Refer to Section 22 05 29.
- N. Install underground PVC per ASTM D2321.

### **3.4 ERECTION TOLERANCES**

- A. Establish invert elevations, slopes for drainage to 1/4 inch per foot (smaller than 3 inch pipe), and 1/8 inch per foot (3 inches and larger) minimum, unless noted otherwise on drawings. Maintain gradients.

### **3.5 TESTING OF PLUMBING SYSTEMS**

- A. Test sanitary and vent piping with air pressure of 5 psig for a period of 15 minutes.
- B. Provide final test with fixtures in place with 1 inch water column air pressure.

**END OF SECTION**



**SECTION 22 13 19**  
**SANITARY WASTE PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Floor drains.
- B. Cleanouts.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 13 16 – Sanitary Waste and Vent Piping.
- C. Section 22 42 00 – Commercial Plumbing Fixtures.

**1.3 REFERENCES**

- A. ASME A112.21.1 - Floor Drains.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under the provisions of Section 22 05 00.
- B. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 22 05 00 - Warranties.
- B. Project Record Documents: Record actual locations of all sanitary specialties.
- C. Operation Data: Indicate frequency of treatment required for interceptors.
- D. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

**1.7 DELIVERY, STORAGE, AND PROTECTION**

- A. Accept specialties on site in original factory packaging. Inspect for damage.

**PART 2 PRODUCTS**

**2.1 FLOOR DRAINS**

- A. Manufacturers: Josam Model (Refer to Schedule on Drawings), or equivalent by:
  - 1. J.R. Smith.
  - 2. Wade.
  - 3. Watts Drainage Products.
  - 4. Zurn.
  - 5. Substitutions: None.

- B. ANSI A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.

## **2.2 CLEANOUTS**

- A. Manufacturer; Josam Series 57000-X-SD for floors and Series 58600 for walls, or equivalent by:
  - a. J.R. Smith.
  - b. Wade.
  - c. Watts Drainage Products.
  - d. Zurn.
  - e. Substitutions: None.
- B. Interior Finished Floor Areas:
  - 1. Lacquered cast iron body with anchor flange and nikaloy top, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
- C. Interior Unfinished Floor Areas:
  - 1. Lacquered cast iron body with anchor flange and bronze top, reversible clamping collar, threaded top assembly, and round gasketed scored cover.
- D. Interior Finished Wall Areas:
  - 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
- E. Interior Unfinished Accessible Areas:
  - 1. Caulked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.

**END OF SECTION**



**SECTION 22 34 36**  
**DOMESTIC GAS WATER HEATERS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Domestic gas-fired water heaters.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 05 53 – Identification for Plumbing Piping and Equipment.

**1.3 REFERENCES**

- A. ASHRAE 90A - Energy Conservation in New Building Design.
- B. NFPA 54 - National Fuel Gas Code.
- C. NFPA 70 - National Electrical Code.

**1.4 SUBMITTALS FOR REVIEW**

- A. Section 22 05 00 - Submittals.
- B. Product Data:
  - 1. Indicate pump type, capacity, power requirements.
  - 2. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
  - 3. Provide electrical characteristics and connection requirements.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 22 05 00 - Project Closeout.
- B. Project Record Documents: Record actual locations of components.
- C. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:
  - 1. American Gas Association (AGA).

**1.7 REGULATORY REQUIREMENTS**

- A. Conform to AGA requirements for water heaters.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

**1.8 DELIVERY, STORAGE, AND PROTECTION**

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

## **1.9 WARRANTY**

- A. Section 22 05 00 - Warranties.
- B. Provide six (6) year manufacturer warranty for tank and one (1) year on entire package.

## **PART 2 PRODUCTS**

### **2.1 GAS FIRED WATER HEATERS**

- A. Manufacture;: A.O. Smith, refer to schedule on drawings:
  - 1. State.
  - 2. Rheem.
  - 3. Bradford-White.
  - 4. Bock.
  - 5. Substitutions: None.
- B. Performance: Refer to schedule on drawings.
- C. Venting: Closed combustion, two (2) pipe system. 3" diameter CPVC air intake pipe and 3" diameter CPVC exhaust pipe; draft inducer. Sidewall outdoor concentric termination kit for intake and relief.
- D. Tank: Glass lined welded steel; thermally insulated with foam insulation and encased in corrosion-resistant steel jacket; baked-on enamel finish.
- E. Venting: 3" diameter PVC air intake pipe and 3" diameter PVC exhaust pipe; power burner.
- F. Controls: Integrated solid state temperature and ignition control device with integral diagnostics, LED fault display capability and a digital display of temperature settings.
- G. Accessories: Brass water connections and PEX dip tube, drain valve, magnesium anode, vent concentric terminal kit, and ASME temperature and pressure relief valve and a Leonard Model 270 temperature limiting valve set to 100<sup>0</sup> discharge temperature.
- H. Provide a complete acid reduction/neutralizing kit for the condensate drain. Extend piping to the floor drain.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install water heaters in accordance with manufacturer's instructions and to AGA and UL requirements.
- B. Coordinate with plumbing piping and related fuel piping, gas venting and electrical work to achieve operating system.
- C. Gas Fired Water Heaters:
  - 1. Provide CPVC intake and vent piping to outdoors with manufacturer's termination kit. This contractor is to provide all materials and labor necessary in order to provide a complete and operating water heater system.
- D. Pipe temperature limiting (Mixing) valve per manufacturers' recommendations. Include check valves, ball valves, etc. as required.
- E. Set water heater at 140 degrees for storage.

**END OF SECTION**

**SECTION 22 42 00**  
**COMMERCIAL PLUMBING FIXTURES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Water closets.
- B. Lavatories.
- C. Washer/Waste units.
- D. Showers.

**1.2 RELATED SECTIONS**

- A. Section 22 05 00 – Common Work Results for Plumbing.
- B. Section 22 11 16 – Domestic Water Piping.
- C. Section 22 13 16 – Sanitary Waste and Vent Piping.
- D. Section 22 34 36 – Commercial Gas Domestic Water Heaters.

**1.3 REFERENCES**

- A. ANSI A117.1 – Accessible and Usable Buildings and Facilities.
- B. ARI 1010 - Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers.
- C. ASME A112.6.1 - Supports for Off-the-Floor Plumbing Fixtures for Public Use.
- D. ASME A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
- E. ASME A112.19.2 - Vitreous China Plumbing Fixtures.
- F. ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.
- G. NFPA 70 - National Electrical Code.

**1.4 SUBMITTALS FOR REVIEW**

- A. Section 22 05 00 - Submittals: Procedures for submittals.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Manufacturer's Instructions: Indicate installation methods and procedures.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 22 05 00 - Project Closeout.
- B. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Fixtures shall be free from flaws and blemishes, with finished surfaces clear, smooth and bright. Surfaces coming into contact with walls, floors or surfaces of other fixtures shall be ground true.

## **1.7 REGULATORY REQUIREMENTS**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

## **1.8 DELIVERY, STORAGE, AND PROTECTION**

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

## **1.9 WARRANTY**

- A. Section 22 05 00 - Warranties.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Water closets; American Standard, Eljer, Bradford White, Zurn.
  - 1. Flush valves; Sloan, Zurn.
  - 2. Seats; Bemis, Beneke, Church, Olsonite.
  - 3. Carriers; Josam, Jonespec, J.R. Smith, Wade, Watts Drainage Products, Zurn.
- B. Lavatories; American Standard, Eljer, Bradford White, Zurn.
  - 1. Faucets; Chicago, Zurn.
  - 2. Carriers; Josam, Jonespec, J.R. Smith, Wade, Watts Drainage Products, Zurn.
  - 3. Insulation kits; Truebro, Brocar, Plumberex Specialty Products, Pro Wrap.
- C. Washer/Waste units; Guy Gray.
- D. Showers (acrylic); Aquarius, Fiat.
  - 1. Trim; Chicago Faucet.
  - 2. Trim; Delta, Moen.
  - 3. Mixing valves; Lawler, Powers, Symmons.
- E. Substitutions; None.

### **2.2 FIXTURES**

- A. Refer to Schedule on Drawings for Plumbing Fixture Specifications.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

### **3.2 PREPARATION**

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in Plumbing Fixture Schedule on Drawings.
- B. Provide brackets, braces or reinforcing angles as required in all partitions not sufficient in themselves to support plumbing fixtures or other wall-hung equipment.

### **3.3 INSTALLATION**

- A. Connect fixture waste to waste line with iron ferrule and threaded pipe, other than water closets and trap standard fixtures.
- B. Install each fixture with chrome plated, 17 gauge tubing trap with cleanout, easily removable for servicing and cleaning.
- C. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
- D. Install components level, plumb and secure.
- E. Install and secure fixtures in place with wall carriers and bolts.
- F. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.
- G. Mount lever control for handicapped water closets on wide side of toilet stall.
- H. Insulate waste and supplies for all handicapped fixtures.
- I. Connect floor mounted water closets with cast iron floor flange with ring putty or gaskets.
- J. Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.
- K. Provide stop and waste valve on branch piping to all wall hydrants.

### **3.4 ADJUSTING**

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

### **3.5 CLEANING**

- A. Clean plumbing fixtures and equipment.

### **3.6 PROTECTION OF FINISHED WORK**

- A. Do not permit use of fixtures during construction.

### **3.7 SCHEDULES**

- A. Fixture Heights: Refer to Architectural Drawings.
- B. Fixture Rough-In: Refer to Plumbing Fixture Rough-in Schedule on Drawings.

**END OF SECTION**



**SECTION 23 05 00**  
**COMMON WORK RESULTS FOR HVAC SYSTEMS**

**PART 1 GENERAL**

**1.1 WORK INCLUDES**

- A. Furnishing labor, materials, equipment and services required for the complete installation of new heating and ventilating shown on the Drawings and specified in Division 23.
- B. All work shall be complete and shall be left in operating condition.
- C. Include all parts and labor, which are incidental and necessary for a complete and operable installation even though not specifically mentioned in the Contract Documents.
- D. Some equipment and materials provided under Division 21, 22, 23, 25 or Division 26 may require composite work crews because of trade jurisdiction. Where this occurs, include in the bid this portion of the composite crew labor costs. It is the Contractor's responsibility to review Division 21, 22, 23, 25 and Division 26 Contract Documents to determine where these composite crews are required.
- E. Obtain all temporary and permanent permits and licenses required in connection with this Division's work. Pay all fees and expenses required for such permits and licenses.
- F. Request inspections as required by regulating agencies and/or regulations. Pay all charges for inspections by regulating agencies of installations of plans specifications.
- G. Include State and Local sales taxes in the bid. Keep accurate records of these taxes and furnish such records to the Owner upon request.
- H. Provide the Owner with a certificate of final inspection and approval by enforcement authorities.
- I. Furnish labor, equipment, and materials required for cutting, demolition, removal, patching, and restoration work necessary to accomplish and complete all demolition, including any relocation or reuse of existing materials, equipment, systems, as well as the disposition of salvaged materials or debris.

**1.2 RELATED SECTIONS**

- A. General Provisions are specifically applicable to all Division 23 Sections.
- B. Divisions 0 and 1 apply to all work of Division 23 and are an integral part of this Section. Where the conditions specified are at variance with other Divisions, Section 23 05 00 takes precedence. Section 23 05 00 specifies conditions, procedures, equipment and material particular to the mechanical work and applies to all mechanical work of the Contract Documents.
- C. Division 0 and 1 and Section 23 05 00 and all Addenda form a part of and apply to all contracts or sub-contracts relating to Division 23 work. Copy these documents to all Sub-contractors receiving other Sections of Division 23.
- D. Where a Specification Section refers to other Sections under the Article on "Related Sections", this is done for Contractor's convenience only. It shall in no way relieve the Contractor of responsibilities stated in other Sections of the Specifications, even though these Sections are not specifically referenced. The Contractor is responsible for all information contained in this Division's Specifications as well as for information contained in all other Divisions.

**1.3 WORK SEQUENCE**

- A. Coordinate all work of this Section with all subcontractors so the work will progress without interruption and without delays.

- B. Coordinate and schedule the work with the Owner and Construction Manager where possible disturbance may occur or where relocations or other potential disruptions of the Owner's functions and services are required. Perform all work affecting the Owner's functions and services at times acceptable to the Owner, even if this requires the Contractor to do the work in stages as directed by the Owner and Construction Manager.

#### **1.4 REGULATORY REQUIREMENTS**

- A. Meet or exceed all current applicable codes, ordinances and regulations for all installations. Promptly notify the Engineer, in writing, if the contract documents appear to conflict with governing codes and regulations. Contractor assumes all responsibility and costs for correcting non-complying work installed without notifying the Engineer.
- B. Higher quality of workmanship and materials indicated in the Contract Documents takes precedence over that allowed in referenced codes and standards.
- C. Perform all work in compliance with the currently adopted version of the following codes and standards for this project:

- Americans with Disabilities Act
- National Electric Code
- NFPA 90A Air Conditioning and Ventilating Systems
- NFPA 101 Life Safety Code
- Occupational Safety and Health Administration Regulations
- State and Local Building Codes
- State and Local Electrical Codes
- State and Local Fire Codes and Regulations
- State and Local Mechanical Codes
- State Industrial Commission Regulations
- State Energy Code
- Uniform Federal Accessibility Standards
- AIA Guidelines

#### **1.5 REFERENCES**

- A. Use the Standard where referenced in the specifications by the following abbreviations:

- AABC - Associated Air Balance Council
- ADC - Air Diffusion Council
- AGA - American Gas Association
- AIA - American Institute of Architects
- AMCA - Air Moving and Conditioning Association, Inc.
- ANSI - American National Standards Institute
- ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
- ASME - American Society of Mechanical Engineers
- ASTM - American Society of Testing and Materials
- AWWA - American Water Works Association
- EPA - Environmental Protection Agency
- FM - Factory Mutual
- IEEE - Institute of Electrical and Electronic Engineers
- IES - Illuminating Engineering Society of North America
- ICEA - International Cable Engineers Association
- IRI - Industrial Risk Insurance
- NEBB - National Environmental Balancing Bureau
- NBFU - National Bureau of Fire Underwriters
- NBS - National Bureau of Standards
- NEMA - National Electrical Manufacturers Association
- NFPA - National Fire Protection Association
- NSC - National Safety Council
- OSHA - Occupational Safety and Health Administration



PDI - Plumbing and Drainage Institute  
SMACNA - Sheet Metal and Air Conditioning Contractors National Association  
UL - Underwriter's Laboratories

## 1.6 DEFINITIONS

- A. Contract Documents: References to Contract Documents refers to a complete set of Drawings and Specifications for the entire Project. Drawings and Specifications are intended to supplement one another. Provide items shown on the Drawings but not mentioned in the Specifications and items mentioned but not shown the same as if they were both mentioned and shown. Bid the most expensive interpretation of a conflict between Drawings and Specifications so the conflict can be resolved with a deduct rather than an add to the contract amount.
- B. Dimensions: Arrangement of equipment, accessories, piping and ductwork on the Drawings is generally diagrammatic unless the Drawings include dimensions. Do not scale the Drawings. Field verify all dimensions at the site to locate new and existing work.
- C. Furnish: To obtain, coordinate, submit the necessary drawings, deliver to the job site in new condition ready for installation, unload and unpack, and guarantee.
- D. Install: To receive at the job site, store, assemble, erect, set in place, anchor, apply, finish, protect, clean, test, start-up, and make ready for Owner's use.
- E. Provide: To furnish and install.
- F. Responsibility: Where verbs such as "furnish", "provide", "install", or "use" appear in the Contract Documents, they mean, "The Mechanical Contractor shall furnish, provide, install, or use...." unless the requirement is introduced by a phrase, sentence or heading specifically identifying the requirement as the responsibility of someone else.

## 1.7 SUBMITTALS

- A. Substitutions
  - 1. Submit written requests to use products not listed in the Specifications to the Engineer no later than ten (10) calendar days prior to the bid opening. Submit detailed information for proposed material or equipment.
  - 2. Accepted substitutions will be incorporated in an Addendum to the Contract Documents.
  - 3. Contractor is responsible for dimensional differences, weights, electrical requirements and any other resulting changes, when using equipment other than that scheduled on the Drawings. Contractor is responsible for any additional costs incurred as a result of substitutions, including other Contractors and Architect/Engineer fees.
  - 4. Material and equipment not listed in the Specifications or accepted in an Addendum will be removed and replaced at no cost or inconvenience to the Owner.
- B. List of Materials, Equipment and Sub-Contractors
  - 1. Submit a complete list of all materials, equipment, and sub-contractors, proposed to be used on this project, to the Engineer within seven (7) calendar days of the award of contract or written notice to proceed.
  - 2. Acceptance of items on the list are considered final, unless additional information or submissions are required by the Engineer. Unacceptable items will be rejected and resubmitted.
- C. Pay Request Cost Breakdown
  - 1. Provide Schedule of Values for the utilization of submitting a "Pay Request". Allocate appropriate share of overhead and profit to each item. Separate each item into labor and material.

2. Submit cost breakdown on AIA document G703. Provide minimum breakdown as indicated below. Provide additional breakdown as required for clarity or as requested by the Engineer.
  - a. Basic Materials and Methods
  - b. Heat Generation Equipment
  - c. Heating, Ventilating and Air Conditioning Equipment
  - d. Air Distribution
  - e. Testing, Adjusting and Balancing

D. Submittals for Review

1. Submit in accordance with Division 0 and Division 1. Submit drawings to the Engineer for review within 30 calendar days after award of Contract.
2. Include project name, name of Architect, name of Engineer, contractor, sub-contractor, manufacturer, supplier and sales representative, include name, address, and phone number for the sales representative. Clearly identify section number and description of equipment submitted. Shop drawings not including all of this information will be returned without review.
3. Examine all shop drawings noting capacity, arrangement and physical dimensions. Clearly mark all relevant items on catalog data and cross-out unrelated information. Review and stamp shop drawing prior to submitting to the Engineer.
4. Submit a minimum of six (6) sets of shop drawings. The Engineer will distribute as follows:
  - a. Engineer - One (1) copy.
  - b. Architect - One (1) copy.
  - c. General Contractor - Remaining copies (two copies to be incorporated into the O&M Manuals.
5. All shop drawings must be reviewed and accepted by the Engineer prior to fabrication and installation.
6. Submittals will be reviewed with the following actions:
  - a. NO EXCEPTIONS TAKEN—Indicates the Submittal appears to conform to the design concept of the Work and that the Contractor at his discretion, may proceed with fabrication and/or procurement and installation.
  - b. MAKE CORRECTIONS NOTED—Indicates that the Submittals, after noted corrections are made, would appear to conform to the design concept of the Work and that the Contractor, at his discretion, may proceed with fabrication and/or procurement and installation, if the corrections are accepted by the Contractor without an increase in Contract Sum or Time.
  - c. REJECTED—Indicates that the Submittal does not appear to conform to the specifications, and that a complete resubmittal is required. The Contractor shall not proceed with fabrication or procurement.
  - d. NO ENGINEER ACTION REQUIRED—Indicates the Contractor may proceed without review of the Submittal based on provisions of the Contract Documents.
7. Allow a minimum of fourteen (14) calendar days for the Engineer to review the shop drawings. Time is from the receipt of drawings in the Engineers office until they are shipped out of the office.
8. If the Engineer rejects (Make corrections noted/Submit corrected copy, Rejected/Submit specified item) two (2) times for the same section the Engineer will be compensated for the additional reviews. Compensation will be incorporated by Change Order and deducted from the Contractor's application for payment. Contractor is responsible for delays caused by the resubmittal process.

9. Submit shop drawings for the following equipment and systems:

<b>Section</b>	<b>Description</b>
23 05 13	Common Motor Requirements for HVAC Equipment
23 05 29	Hanger and Supports for HVAC Piping, Ductwork and Equipment
23 05 53	Identification for HVAC Piping, Ductwork and Equipment
23 05 93	Testing, Adjusting and Balancing for HVAC
23 07 13	Duct Insulation
23 31 13	Metal and Non-Metal Ductwork, Casings and Plenums
23 33 13	Ductwork Accessories
23 37 13	Air Outlets and Inlets
23 54 00	Furnaces, Air Coils and Energy Recovery Unit
23 62 13	Remote Air Cooled Condensing Units

**1.8 CAD DRAWING FILES**

- A. The mechanical CAD drawing files prepared by Hallberg Engineering, Inc. for this project are Instruments of Service of Hallberg Engineering, Inc. for use solely with respect to this project and will not be made available to the Contractor.
- B. Request CAD drawing files of Architectural floor plans, elevations, sections, etc directly from the Architect.

**1.9 QUALITY ASSURANCE**

- A. Regulatory Requirements:
  - 1. Initiate, maintain and supervise all safety precautions required with this work in accordance with the regulations of the Occupational Safety and Health Administration (OSHA) and other governing agencies.
- B. Environmental Requirements:
  - 1. Do not remove or disturb any asbestos containing materials from the project. Immediately stop work and notify the Owner if asbestos containing materials are suspected.
- C. Accomplish all work of cutting, removal, demolition, relocation, patching, and restoration by using only mechanics skilled in the trade required. Provide for the safety of the existing building and personnel, as well as for new construction as a result of work, procedures, operations or activities under this Contract.
- D. Where the work of removals, demolition, cutting and similar work involves structural considerations, consult with Engineer. Exercise extreme care to avoid damage and preserve the safety of the structure and of all personnel. Particular care must be taken where the demolition or removals occur adjacent to occupied areas.
- E. Utilize competent and qualified technical assistance to develop safe methods and techniques to accomplish the work, including temporary shoring and supports, methods of removal and other considerations. Design and place all permanent or temporary supports to carry all loads down to sound bearing.

**1.10 PROJECT/SITE CONDITIONS**

- A. Correlation of Work:
  - 1. Consult the drawings and specifications of Division 26 and other trades for correlating information and lay out work so that it will coordinate with other trades. Verify dimensions and conditions (i.e., finished ceiling heights, footing and foundation elevations, beam depths, etc.) with the Architectural and Structural drawings. Notify the Architect/Engineer of any conflicts that can not be resolved, in the field, by affected trades. Replacement of work due to lack of coordination and failure to verify existing conditions will be completed at no cost to the Owner.

2. Drawings may not show every rise and offset required for the work. Install piping and ductwork to accommodate the building structure and the work of other trades, with all required offsets and without extra cost to the Owner.
3. Where work must be replaced due to the failure of the Contractor to verify the conditions existing on the job, such replacement must be accomplished at no cost to the Owner. This applies to shop fabricated work as well as to work fabricated in place.
4. Throughout the course of the work, minor changes and adjustments to the installation may be requested by the Engineer. The Contractor shall make adjustments without additional cost to the Owner, where such adjustments are necessary to the proper installation and operation within the intent of the Contract Documents. This does not include work already completed.
5. Equipment outlines shown on detail plans of 1/4"=1'-0" scale or larger and/or dimensions indicated on the plans are limiting dimensions. Do not install any equipment that exceeds the equipment outlines shown or reduces indicated clearances.
6. Obtain exact location of connection to equipment, furnished by others, from the person furnishing the equipment.
7. Drawings and Specifications are complementary and what is called for in either is as binding as if called for in both.
8. Include the better quality, greater quantity or higher cost for an item or arrangement where a disagreement exists in the Drawings and Specifications.

#### **1.11 WARRANTY**

- A. Guarantee and maintain the stability of work and materials and keep same in perfect repair and condition for the period of one (1) year after the final completion of the work as evidenced by issuance of the final certificate by the Architect.
- B. Defects of any kind due to faulty work or materials appearing during the above mentioned period must be immediately made good by the Contractor at his own expense to the entire satisfaction of the Owner and Architect and Engineer. Include damage to the finish or the building resulting from the original defect or repairs.
- C. Guarantee does not apply to injuries occurring after final acceptance and due to wind, fire, violence, abuse or carelessness or other Contractors or their employees or the agents of the Owner.
- D. Guarantee does not apply where other guarantees for different lengths of time are specified in other Sections.

#### **1.12 ELECTRICAL**

- A. Magnetic starters, disconnects, and power wiring provided by the Electrical Contractor, unless otherwise specified.
- B. Control and interlock wiring provided by the Mechanical Contractor, unless otherwise specified.

### **PART 2 PRODUCTS**

#### **2.1 ACCEPTABLE MANUFACTURER'S**

- A. Provide only products from manufacturer's with local representation that can provide complete coverage, parts and labor, for replacement and service of their products. Provide only equipment that will fit in the space available and be completely serviceable. Bring any conflicts to the Engineer's attention prior to ordering the equipment.

## **PART 3 - EXECUTION**

### **3.1 DEMOLITION**

- A. The Drawings generally indicate the extent of demolition, removals, relocations and cutting.
- B. The Drawings are not to be construed as indicating all required work, nor indicating all conditions or details which might be encountered during progress of the work of this Contract.
- C. Examine all areas where demolition is to occur to determine the actual conditions and requirements.
- D. Provide temporary bracing, shoring, and support for the execution of the work and the protection of persons and property during demolition, cutting, remodeling and all related new construction under this Contract. Perform all work with appropriate supports, protection and methods to prevent collapse, settling or damage to property or persons. Provide adequate supports for the loads to be carried, properly distributed, to lower levels or to sound bearing, if necessary.
- E. Provide all protective coverings and enclosures necessary to prevent damage to existing spaces and materials which are to remain. Protect openings in exterior walls and roofs to prevent damage from water and weather and to prevent excessive heat loss from the existing buildings. Maintain a watertight installation by scheduling the work and removals at the exterior according to weather conditions. Temporarily seal unfinished areas to the existing roof or to other exterior surfaces of the existing building.
- F. Provide dustproof temporary enclosures (including above ceilings) to separate the areas under demolition and remodeling from the remainder of the building. Also provide temporary air filters and ductwork to keep construction dust contained within the construction area. Provide temporary hinged doors in temporary enclosures where necessary. Temporary and permanent doors shall be completely sealed with tape or other suitable materials during demolition work and shall remain sealed until the dust has settled.
- G. Demolish and remove existing construction as shown or indicated or as required to accomplish the work.
- H. Where new work is to be installed in or adjacent to existing construction or when existing work is to be replaced, remove or cut the existing construction as necessary to complete the work under the Contract.
- I. Execute the work with care. Remove and replace existing construction that is to remain which is loosened, cracked, or otherwise damaged or defaced, or is rendered unsuitable for its intended use, as a result of the work at no additional cost to the Owner.
- J. Clean demolition areas and remove debris, waste and rubbish from the building at the conclusion of each day's work. Transport debris and rubbish in a manner that prevents the spread of dust. Do not store or permit debris storage at the site. Do not burn or permit the burning of debris, rubbish or waste at the site. Keep adjacent areas unencumbered and clean. Keep all construction areas essentially broom clean.
- K. Abandoned services may be left in place where they will be concealed inside floors or walls, providing they are disconnected from their sources and capped in place. No abandoned services, including piping, ductwork, tubing, etc., in ceilings or exposed.
- L. Assure no "dead end" water, sewer, or vent piping is left in the completed work.
- M. Based on a site inspection and the Contract Documents, the Contractor is responsible for the removal or rerouting of all anticipated mechanical work, exposed and concealed.
- N. Where unanticipated mechanical work is exposed during the removal of partitions, walls, floors or ceilings, the removal or rerouting of this work shall be accomplished by the Contractor under the direction of the Engineer.

- O. Patch or otherwise restore disturbed existing construction and surfaces. Patching or restoration shall be carried to natural breaks. Where existing construction is removed, cut or otherwise disturbed, patch all such disturbed and damaged surfaces.
- P. Perform patching work by skilled mechanics experienced in the particular type of work involved. Conform to the standards of the Specifications where applicable, and where not specified, conform to the highest standards of the trade.
- Q. Patch existing construction to match existing work, but always provide new materials and accomplish the work according to current standards. Examine existing surfaces before proceeding with the work. Report all conditions to the engineer, architect or owner, where existing materials, colors and finishes cannot be matched, but do not proceed until receiving instructions.
- R. Repair existing construction that has been damaged as a result of the work to the extent required to match existing, undamaged construction.
- S. All holes created by removal of existing systems, piping, ductwork, control wiring, tubing, etc., shall be patched and fire caulked.

### **3.2 INSTALLATION**

#### **A. Material and Workmanship**

- 1. Provide new material and equipment, unless noted otherwise. Protect equipment and material from damage, dirt and the weather.
- 2. Provide the highest quality workmanship and perform all work only by skilled mechanics. Install material and equipment in accordance with manufacturers' recommendations, instructions and current standards.
- 3. The Engineer reserves the right to reject material or workmanship not in accordance with the Contract Documents, before or after installation.

#### **B. Ductwork**

- 1. All ductwork shall be run in the most direct and straight manner possible maintaining proper grading.
- 2. It is the intent of these plans and specifications that most ductwork be concealed. Where exposed, run as close to ceiling and/or wall as possible parallel with adjacent structural or architectural elements.
- 3. Do not install piping or ductwork in any switchgear, transformer, elevator equipment, telephone, or electrical equipment room, unless it is a branch serving that room.
- 4. Do not install piping or ductwork above switchboards, panelboards, control panels, motor control centers, etc.
- 5. Arrange work to facilitate maintenance, repair or replacement of equipment. Provide access for devices that require maintenance. For concealed devices, verify that access panels are properly located and labeled.

#### **C. Equipment:**

- 1. Install material and equipment in accordance with the Manufacturer's written instructions.

#### **D. Cutting and Patching:**

- 1. Perform all cutting and patching necessary to work, unless specifically delegated to the General Contractor. Obtain special permission from the engineer before cutting structural members or finished material. Perform all patching in such a manner as to leave no visible trace and return the area affected to the condition of undisturbed work. Perform all patching by workers experienced, skilled, and licensed for the particular type of work involved. Inferior work will not be accepted.

2. Patch all holes left as a result of demolition of mechanical equipment and devices.
3. Drill all holes in masonry with rotary drill. Impact tools are not allowed. Core drill all holes in masonry and concrete for mechanical penetrations. Provide and dispose of all water required for core drilling. Coordinate with other trades to prevent damage from water.
4. Prevent the spread of dust, debris, and other material into adjacent areas.
5. Replace all ceiling tiles damaged during installation of work, with new tile.

E. Painting:

1. Refinish all mechanical equipment damaged during shipping and/or installation to its original condition. Remove all rust; prime, and paint per manufacturer's recommendations for finish equal to original.

F. Record Drawings:

1. Provide Record Drawings in accordance with the requirements of Division 0 and Division 1.
2. Maintain a complete set of Record Drawings showing all modifications to the Contract Documents. Drawings will be stamped "Record Drawings" and used only for that purpose.
3. As work progresses, record all changes or deviations from the contract drawings in a neat and legible manner as follows:
  - a. Record exact location and elevation of underground mechanical systems including changes in direction, cleanouts etc., by reference to building lines, curbs, walks, and other permanent reference points.
  - b. Record routing of concealed and exposed above ground mechanical systems where it varies from the Contract Documents.
4. The Engineer may recommend withholding payment if Record Drawings are not being maintained.
5. Submit Record Drawings to the Engineer for review at completion of the Work. Submit final record drawings as part of the Operation and Maintenance Manual package after the completion of the project.

### **3.3 TEMPORARY UTILITIES**

- A. Do not use heating, ventilating and air conditioning systems provided in this scope of work for temporary heating, ventilating and air conditioning during construction.

### **3.4 PROTECTION**

- A. Protect openings and equipment from obstruction, breakage, misuse, damage or blemishes. Protect materials and equipment immediately upon receipt at the job site or immediately after they have been removed from their shipping containers. Unless noted otherwise, keep them clean and undamaged until final acceptance of the entire Project by the Owner. When a portion of the building is occupied by the Owner before substantial completion of the entire Project, make arrangements to transfer responsibility for protection and housekeeping for the occupied portion.
- B. Protect pipe, duct and equipment openings with temporary plugs or caps. Keep openings covered until permanent connections are complete.
- C. Contractor is responsible for any damage to mechanical equipment, materials or work until final acceptance of the entire project by the Owner.

### **3.5 CLEAN UP**

- A. Keep the premises free from accumulation of waste material or rubbish, caused by his employees or work, at all times. Remove rubbish, tools, scaffolding, and surplus materials from and about the building, and leave work areas "broom clean" or its equivalent upon completion of the work. Clean mechanical equipment and remove temporary identification.

B. In case of dispute, the Owner will remove the rubbish and charge the cost to the Contractor.

### **3.6 START-UP**

- A. Before start-up, lubricate, charge, and fill systems as specified and according to Manufacturer's instructions.
- B. Test hydronic systems and air systems as specified in Sections governing their installation.
- C. Perform testing, adjusting and balancing in accordance with that Section.
- D. Operate equipment and systems in all their operating modes, to verify proper operation, prior to final field observation and Owner instructions. Notify the Engineer, in writing, that all systems have been tested and are functioning and operating properly.

### **3.7 TESTING, ADJUSTING & BALANCING**

- A. Provide assistance to Test, Adjusting and Balancing Contractor by making adjustments to system and system components required for achieving design performance.
- B. If acceptable performance of any test is not achieved, make the necessary corrections and the test shall be repeated until acceptable performance is achieved.

### **3.8 FINAL FIELD OBSERVATION**

- A. A final field observation of the mechanical systems will be required before Contract Closeout. Request a final observation by the Engineer after all systems are fully completed and operational. The Engineer will schedule a field observation and generate a list of items to be corrected or completed before Contract Closeout.
- B. If the Engineer is requested to make a final field observation by the Contractor, and the Engineer finds the work is not complete enough to perform that observation, the Contractor will compensate the Engineer for their time. The Contractor will then perform the necessary work to complete the project and again request a Final Field Observation.

### **3.9 TRAINING**

- A. Fully instruct the Owner's designated personnel in the operation of each mechanical system at the time it is put into service. Provide instruction using competent instructors and factory trained personnel.
- B. Include documentation of instructions in the Operation and Maintenance Manuals.
- C. Obtain a written statement from the Owner that his designated personnel have been instructed.

### **3.10 UTILITY REBATES**

- A. This Contractor shall secure on behalf of the Owner all utility rebates associated with the design. This shall include all submittals to the utility companies including substantiation where required and making all necessary arrangements on behalf of the Owner.

### **3.11 PROJECT CLOSEOUT**

- A. Operating and Maintenance Manuals: Submit to the Engineer two (2) Operating and Maintenance manuals. Submit in portfolio form neatly edited with similar equipment grouped, tabbed and indexed. Provide printed or typewritten materials. Provide the following in each manual:
  - 1. Shop drawings, approved manufacturer's bulletins, and other appropriate data from specific manufacturer of each piece of equipment furnished and/or installed. Shop drawings, manufacturer's bulletin, and other data shall be appropriate marked to reflect the "as-built" condition. Cross out or delete all information shown on shop drawings or literature not applying to this specific project.
  - 2. Copies of manufacturer's warranties
  - 3. Operating instruction for equipment.



4. Wiring and installation instructions for equipment.
5. Recommended maintenance schedules and procedures for equipment.
6. Recommended trouble shooting procedures for equipment.
7. Equipment parts list.
8. Settings/adjustments/calibrations for systems as required.
9. Local equipment suppliers/ reps names, addresses, and telephone numbers.
10. Equipment manufacturers names, addresses, and telephone numbers.
11. Sub-contractors names, addresses, and telephone numbers.
12. Test reports.
13. Certifications.
14. Test and balance reports.
15. System validation reports.
16. Statement from Contractor that all incomplete items noted in Engineer's Final Field Observation Report have been completed.
17. Statement from Owner confirming completion of Training.
18. Refer to individual Sections in Division 23 for additional requirements.

B. Record Drawings: Submit Record Drawings.

C. Extra Materials: Refer to individual Specification Sections for extra materials to be provided to the Owner.

D. System Startup: Refer to individual Specification Sections for system startup requirements.

### **3.12 JOB CLOSEOUT AND DOCUMENT TURNOVER**

A. Construction Documents CD's, Owner and Operation Manuals (O&M's), As-Builts, Specifications and other documents turned over at the completion of the projects shall be furnished to the Owner in both paper hard copy and digital Adobe PDF.

#### 1. Construction Documents

a. PDF Creation: Each roll of drawings shall be scanned or converted to PDF to one single PDF document.

##### 1) Scanning:

- i) 200DPI Grayscale
- ii) Cropped to original size
- iii) Color corrected and despeckled

b. Bookmarking: Each page of the PDF shall be bookmarked with the number and name of the sheet.

c. Naming: The PDF shall be labeled: "Building Name\_Year\_Title\_Spec\_Type"

- 1) Name = Building Name
- 2) Year = Date of Documents
- 3) Title = "Addition" "Remodel," etc...
- 4) CD = Construction Document
- 5) Type = Arch, Mech, Electrical Communications or a combination of the above

2. Specifications
  - a. PDF Creation: Each book of specifications shall be scanned or converted to PDF to one single PDF document.
    - 1) Scanning:
      - i) 200 DPI Grayscale
  - b. Bookmarking: Not required.
  - c. Naming: The PDF shall be labeled: "Building Name\_Year\_Title\_Spec\_Type"
    - 1) Name = Building Name
    - 2) Year = Date of Documents
    - 3) Title = "Addition" "Remodel," etc...
    - 4) CD = Construction Document
    - 5) Type = Arch, Mech, Electrical Communications or a combination of the above
3. Owners and Operation Manuals
  - a. O & M's shall be turned over by the Contractor.
  - b. PDF Creation: Each book of specifications shall be scanned or converted to PDF to one single PDF document.
    - 1) Scanning:
      - i) 200 DPI Grayscale
  - c. Bookmarking: Bookmarking of O & M Manuals shall be extensive.

**END OF SECTION**

**SECTION 23 05 13**  
**COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Common requirements for electric motors furnished on equipment specified in other Division 23 Sections, including single phase and three phase electric motors.
- B. Power factor correction.
- C. Drives.

**1.2 RELATED SECTIONS**

- A. Section 23 05 00 – Common Work Results for HVAC Equipment.
- B. Section 23 54 00 – Furnaces and Energy Recovery Units.
- C. Section 23 62 13 – Packaged Air Cooled Remote Condensing Units

**1.3 REFERENCES**

- A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- B. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- C. NEMA MG 1 - Motors and Generators.
- D. NEMA MG 30 & 31.
- E. NFPA 70 - National Electrical Code.

**1.4 REGULATORY REQUIREMENTS**

- A. Conform to UL Component Recognition for appropriate sizes.
- B. Conform to NFPA 70 and local energy code.

**1.5 SUBMITTALS FOR REVIEW**

- A. Section 23 05 00 - Submittals.
- B. Shop Drawings:
  - 1. Include manufacturer's product and nameplate data.
  - 2. Include physical and performance data.
  - 3. Include selection data for power factor correction capacitors.

**1.6 DELIVERY, STORAGE, AND PROTECTION**

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

**1.7 DELIVERY, STORAGE AND HANDLING**

- A. Deliver, store, protect and handle products to the site.
- B. Accept controllers on site in original packing. Inspect for damage.
- C. Store in a clean, dry, environmentally-controlled space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris and traffic.

D. Handle in accordance to the manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to components, enclosure and finish

## **1.8 ENVIROMENTAL REQUIREMENTS**

A. Do not store or install unless temperature in maintained between 32 degrees F and 104 degrees F, at a relative humidity less than 95 percent (non-condensing).

B. Maintain conditions during and after installation of Products.

## **1.9 WARRANTY**

A. Section 23 05 00 - Warranties.

## **PART 2 PRODUCTS**

### **2.1 ELECTRIC MOTORS**

A. Manufacturers:

1. Baldor.
2. General Electric.
3. Marathon.
4. Reliance.
5. Substitutions: Refer to Section 23 05 00.

B. General:

1. Motors Less Than 250 Watts, for Intermittent Service: Equipment manufacturer's standard and need not conform to these specifications.
2. Single Phase Motors: PSC for low starting torque, direct drive applications. Capacitor start for high starting torque applications.
3. Electrical Service (unless noted otherwise):
  - a. Motors Smaller than 1/2 HP: single phase, 60 Hz.
  - b. Motors 1/2 HP and Larger: three phase, 60 Hz.
  - c. Refer to the Schedules on Drawings for voltage.
4. Motors to be started across-the-line, unless noted otherwise.
5. Open drip-proof (ODP) type except where specifically noted otherwise.
6. Totally enclosed fan cooled (TEFC), TEAO or TENV motors when exposed to the weather.
7. Design for continuous operation in 40 degrees C environment.
8. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
9. Visible Nameplate: Indicating manufacturer's name and model number, motor horsepower, RPM, frame size, voltage, phase, cycles, full load amps, insulation system class, service factor, maximum ambient temperature, temperature rise at rated horsepower, minimum efficiency.
10. Wiring Terminations:
  - a. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.

- b. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

#### 11. Motor Efficiencies

- a. Efficiency: NEMA Premium Efficiency (1 hp and larger). Follow NEMA Standards Publication MG 1-2003, in Tables 12-12 and 12-13.

#### C. Single Phase Power - Permanent Split Capacitor Motors:

1. Starting Torque: Exceeding one fourth of full load torque.
2. Starting Current: Up to six times full load current.
3. Multiple Speed: Through tapped windings.
4. Open Drip-proof or Enclosed Air Over Enclosure: Class A (50 degrees C temperature rise) insulation, minimum 1.0 Service Factor, prelubricated sleeve or ball bearings, automatic reset overload protector.

#### D. Single Phase Power - Capacitor Start Motors:

1. Starting Torque: Three times full load torque.
2. Starting Current: Less than five times full load current.
3. Pull-up Torque: Up to 350 percent of full load torque.
4. Breakdown Torque: Approximately 250 percent of full load torque.
5. Motors: Capacitor in series with starting winding; provide capacitor-start/capacitor-run motors with two capacitors in parallel with run capacitor remaining in circuit at operating speeds.
6. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.

#### E. Three Phase Power - Squirrel Cage Motors:

1. Starting Torque: Between 1 and 1-1/2 times full load torque.
2. Starting Current: Six times full load current.
3. Power Output, Locked Rotor Torque, Breakdown or Pull Out Torque: NEMA Design B characteristics.
4. Design, Construction, Testing, and Performance: Conform to NEMA MG 1 for Design B motors.
5. Insulation System: NEMA Class F with Class B rise.
6. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
7. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum AFBMA 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt centre line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.
8. Sound Power Levels: To NEMA MG 1.

## 2.2 POWER FACTOR CORRECTION

#### A. Manufacturers:

1. Cornell-Dubelier.
2. General Electric.

3. Ronk Electrical Industries.
  4. Sprague.
  5. Westinghouse.
  6. Zucker.
- B. Provide power factor correction capacitors for motors 3 horsepower or larger in accordance with the following requirements. Capacitors shall be selected so that they do not overcorrect the power factor beyond 99.99% throughout the range of operation of the motor. Reference to "full load" means the rated motor horsepower not including the service factor.
1. Motors with Constant Load: Correct to a minimum 95% power factor when operating at 65% of full load.
- C. If equipment is furnished with a control panel, that panel shall come with power factor correction capacitors factory installed and wired.
- D. For equipment that does not have a control panel, the equipment supplier shall be responsible for furnishing the capacitors and installing them at either the motor disconnect or motor control center.
- E. Individual capacitors shall be dry electrolytic type and enclosed in integrated dust tight enclosure.

### **2.3 MOTOR CONTROLLERS**

- A. In general, motor controllers will be furnished and installed under Division 26 unless the motor controller is an integral part of a piece of equipment, or noted otherwise.
- B. Where control components are factory furnished, a control transformer with fused secondary shall be provided to reduce voltage to 120 volts to operate control and safety devices.

### **2.4 BELT DRIVES**

- A. V-belt drives for equipment with motors smaller than 3 horsepower shall be rated for 150% of rated horsepower of the driven equipment with matched pulleys and belts. V-belt drives for equipment with motors 3 horsepower and larger shall be rated for 200%.
- B. Variable pitch drives shall be selected so that the fan speed at the specified operating conditions is approximately centered on the sheave adjustment range.
- C. Except as specified otherwise, provide variable sheaves for motors 15 HP and smaller and fixed sheaves for motors 20 HP and larger.
- D. Where motors are used with variable frequency drive systems, provide fixed sheaves. Select sheaves at an RPM which will provide 15 percent greater capacity that called out on drawings. Final capacity adjustments will be made with the variable frequency drive system.
- E. Belt driven equipment shall include an adjustable motor base for adjusting belt tension.

## **PART 3 EXECUTION**

### **3.1 COORDINATION**

- A. Provide the necessary control interface that will accept and understand the input from the controlling entity. Verify the interface requirements with the temperature control contractor.

### **3.2 INSTALLATION**

- A. Motors
  1. Install motors, power factor correction capacitors, and drives in accordance with manufacturer's instructions.

2. Wire power factor correction capacitors to motor starters.
3. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
4. Check line voltage and phase and ensure agreement with nameplate.
5. Check rotation of motor driven equipment and lubricate as recommended by manufacturer.
6. Align all drive systems and adjust belt tension. Remove pulley set screws, install thread locking substance on threads, and reinstall screws, torquing to manufacturer's specifications.
7. Check and adjust belt guards so that no parts are in contact with rotating equipment.

### **3.3 DEMONSTRATION**

- A. Fully instruct the Owner's personnel as to the proper operation of the equipment.

**END OF SECTION**





**SECTION 23 05 53**  
**IDENTIFICATION FOR HVAC PIPING, DUCTWORK AND EQUIPMENT**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Nameplates.
- B. Stencils.

**1.2 RELATED SECTIONS**

- A. Section 23 05 00 – Common Work Results for HVAC Equipment.

**1.3 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 23 05 00.
- B. Product Data: Provide manufacturers catalog literature for each product required.
- C. Manufacturer's Instructions: Indicate installation instructions, special procedures, and installation.

**1.4 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 23 05 00: Procedures for submittals.

**1.5 REGULATORY REQUIREMENTS**

- A. Conform to ANSI/OSHA.

**PART 2 PRODUCTS**

**2.1 NAMEPLATES**

- A. Manufacturers:
  - 1. Seton.
  - 2. Brady.
  - 3. Substitutions: Refer to Section 23 05 00.
- B. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

**2.2 STENCILS**

- A. Stencils: With clean cut symbols and letters of following size:
  - 1. Ductwork and Equipment: 2 inch high letters.
- B. Stencil Paint: Semi-gloss enamel, colors and lettering size conforming to ASME A13.1.

**PART 3 EXECUTION**

**3.1 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.

**3.2 INSTALLATION**

- A. Install identifying devices after completion of coverings and painting.
- B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

- C. Identify air handling units, furnaces, heat recovery units with plastic nameplates or stencils. Small devices, such as in-line pumps, may be identified with tags.
- D. Identify control panels and major control components outside panels with plastic nameplates.
- E. Tag automatic controls, instruments, and relays. Key to control schematic.
- F. Identify ductwork with stenciled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

### **3.3 SCHEDULES**

- A. Identification:
  - 1. Equipment: Use nomenclature as noted on the drawings.
  - 2. Ductwork: Use description as noted on the drawings.

**END OF SECTION**

**SECTION 23 05 93**  
**TESTING, ADJUSTING, AND BALANCING FOR HVAC**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of new and existing HVAC systems and as noted on drawings.
- B. Measurement of final operating condition of HVAC systems.

**1.2 RELATED SECTIONS**

- A. Section 23 05 00 – Common Work Results for HVAC Equipment.

**1.3 REFERENCES**

- A. AABC - National Standards for Total System Balance.
- B. ADC - Test Code for Grilles, Registers, and Diffusers.
- C. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.
- D. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
- E. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 23 05 00.
- B. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- C. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
- D. Prior to commencing work, submit detailed procedures, agenda, sample report forms.
- E. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.
- F. Provide reports in letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
- G. Test Reports: Indicate data on AABC National Standards for Total System Balance forms, forms prepared following ASHRAE 111, NEBB forms, containing information indicated in Schedules.

**1.5 PROJECT RECORD DOCUMENTS**

- A. Submit under provisions of Section 23 05 00.

**1.6 QUALITY ASSURANCE**

- A. Services provided by independent qualified Testing and Balancing Agency.
- B. Provide services to Mechanical Contractor.
- C. Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

## **1.7 QUALIFICATIONS**

- A. Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum ten years documented experience certified by AABC or NEBB.
- B. Perform Work under supervision of registered Professional Engineer experienced in performance of this Work and licensed in the State of Minnesota.

## **1.8 SCHEDULING**

- A. Schedule work under the provisions of Section 23 05 00.

## **PART 2 PRODUCTS**

Not used

## **PART 3 EXECUTION**

### **3.1 AGENCIES**

- A. Air Systems Engineering.
- B. BalTech.
- C. Premier Test and Balance
- D. Systems Management and Balancing.
- E. Substitutions: Refer to Section 23 05 00.

### **3.2 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  - 1. Air systems are started and operating in a safe and normal condition.
  - 2. Temperature control systems are installed complete and operable.
  - 3. Proper thermal overload protection is in place for electrical equipment.
  - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  - 5. Duct systems are clean of debris.
  - 6. Fans are rotating correctly.
  - 7. Fire and volume dampers are in place and open.
  - 8. Air coil fins are cleaned and combed.
  - 9. Access doors are closed and duct end caps are in place.
  - 10. Air outlets are installed and connected.
  - 11. Duct system leakage is minimized.
- B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
- C. Beginning of work means acceptance of existing conditions.

### **3.3 PREPARATION**

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

### **3.4 INSTALLATION TOLERANCES**

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus Heat Recovery Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 5 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 5 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 5 percent of design.

### **3.5 ADJUSTING**

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- E. At final field observation by the Engineer, recheck random selections of data recorded in report up to 10% of tested devices. Recheck points or areas as selected and witnessed by the Engineer.
- F. Check and adjust systems approximately six months after final acceptance and submit report.

### **3.6 AIR SYSTEM PROCEDURE**

- A. Adjust air handling and distribution systems to provide required or design supply, return, outside air, and exhaust air quantities.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets with direct reading velocity meters or flow hoods in accordance with manufacturers instructions.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required, including belts and pulleys. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air, return air, relief air and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Verify operation of temperature control dampers to assure shut-off and proper position with controller. Make adjustments if necessary.
- L. Measure building static pressure and adjust supply, return, relief and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

### 3.7 SCHEDULES

#### A. Equipment Requiring Testing, Adjusting, and Balancing

- Air Filters
- Air Inlets and Outlets
- Fans
- Heat Recovery
- Condensing Units
- Furnaces

#### B. Report Forms

##### 1. Title Page:

- a. Name of Testing, Adjusting, and Balancing Agency
- b. Address of Testing, Adjusting, and Balancing Agency
- c. Telephone number of Testing, Adjusting, and Balancing Agency
- d. Project name
- e. Project location
- f. Project Architect
- g. Project Engineer
- h. Project Contractor
- i. Project altitude
- j. Report date

##### 2. Summary Comments:

- a. Design versus final performance
- b. Notable characteristics of system
- c. Description of systems operation sequence
- d. Summary of outdoor and exhaust flows to indicate amount of building pressurization
- e. Nomenclature used throughout report
- f. Test conditions

##### 3. Instrument List:

- a. Instrument
- b. Manufacturer
- c. Model number
- d. Serial number
- e. Range
- f. Calibration date

##### 4. Electric Motors:

- a. Manufacturer
- b. Model/Frame
- c. HP/BHP
- d. Phase, voltage, amperage; nameplate, actual, no load

- e. RPM
  - f. Service factor
  - g. Starter size, rating, heater elements
  - h. Sheave Make/Size/Bore
5. V-Belt Drive:
- a. Identification/location
  - b. Required driven RPM
  - c. Driven sheave, diameter and RPM
  - d. Belt, size and quantity
  - e. Motor sheave diameter and RPM
  - f. Center to center distance, maximum, minimum, and actual
6. Air Cooled Condensing Unit:
- a. Identification/number
  - b. Location
  - c. Manufacturer
  - d. Model number
  - e. Serial number
  - f. Entering DB air temperature, design and actual
  - g. Leaving DB air temperature, design and actual
  - h. Number of compressors
7. Cooling Coil Data:
- a. Identification/number
  - b. Location
  - c. Service
  - d. Manufacturer
  - e. Air flow, design and actual
  - f. Air pressure drop, design and actual
8. Electric Heating Coil Data:
- a. Identification/number
  - b. Location
  - c. Service
  - d. Manufacturer
  - e. Air flow, design and actual
  - f. Phase, voltage, amperage; nameplate, actual, no load
  - g. RPM
  - h. Service factor
  - i. Starter size, rating, heater elements

- j. KW
- 9. Air Moving Equipment
  - a. Location
  - b. Manufacturer
  - c. Model number
  - d. Serial number
  - e. Arrangement/Class/Discharge
  - f. Air flow, specified and actual
  - g. Return air flow, specified and actual
  - h. Outside air flow, specified and actual
  - i. Total static pressure (total external), specified and actual
  - j. Inlet pressure
  - k. Discharge pressure
  - l. Sheave Make/Size/Bore
  - m. Number of Belts/Make/Size
  - n. Fan RPM
- 10. Return Air/Outside Air Data:
  - a. Identification/location
  - b. Design air flow
  - c. Actual air flow
- 11. Duct Traverse:
  - a. System zone/branch
  - b. Duct size
  - c. Area
  - d. Design velocity
  - e. Design air flow
  - f. Test velocity
  - g. Test air flow
  - h. Duct static pressure
- 12. Air Distribution Test Sheet:
  - a. Air terminal number
  - b. Room number/location
  - c. Terminal type
  - d. Terminal size
  - e. Area factor
  - f. Design velocity
  - g. Design air flow



- h. Test (final) velocity
  - i. Test (final) air flow
  - j. Percent of design air flow
13. Combustion Test: (Furnace and Water Heater)
- a. Burner manufacturer
  - b. Model number
  - c. Serial number
  - d. Firing rate
  - e. Overfire draft
  - f. Gas meter timing dial size
  - g. Gas meter time per revolution
  - h. Gas pressure at meter outlet
  - i. Gas flow rate
  - j. Heat input
  - k. Burner manifold gas pressure
  - l. Percent carbon monoxide (CO)
  - m. Percent carbon dioxide (CO<sub>2</sub>)
  - n. Percent oxygen (O<sub>2</sub>)
  - o. Percent excess air
  - p. Flue gas temperature at outlet
  - q. Ambient temperature
  - r. Net stack temperature
  - s. Percent stack loss
  - t. Percent combustion efficiency
  - u. Heat output

**END OF SECTION**



**SECTION 23 07 13**  
**DUCT INSULATION**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Ductwork insulation.

**1.2 RELATED SECTIONS**

- A. Section 23 05 00 – Common Work Results for HVAC Equipment.
- B. Section 23 05 53 – Identification for HVAC Piping, Ductwork and Equipment.
- C. Section 23 31 13 – Metal and Non-Metal Ductwork Casing and Plenums.

**1.3 REFERENCES**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. NAIMA National Insulation Standards.
- C. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- E. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.
- F. ASTM C411 Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
- G. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- H. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- I. ASTM E119 Standard Test Method for Fire Tests of Building Construction and Materials.
- J. ASTM E136 Standard Test Method for Behavior of materials in a Vertical Tube Furnace at 750°C.
- K. ASTM E814 Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- L. UL 910 Test for Flame-Propagation and Smoke-Density Values for Electrical and Optical-Fiber Cables Used in Spaces Transporting Environmental Air.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Section 23 05 00.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience approved by manufacturer.

**1.6 REGULATORY REQUIREMENTS**

- A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E84, NFPA 255 and UL 723.

- B. Conform to ASTM Standards for “k” value, moisture vapor transmission, maximum moisture absorption, jacket, insulating cement, and adhesive.

### **1.7 DELIVERY, STORAGE, AND PROTECTION**

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

### **1.8 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

## **PART 2 PRODUCTS**

### **2.1 GLASS FIBER, FLEXIBLE**

- A. Manufacturer: Schuller-Manville 800 Series Spin-Glas
- B. Other acceptable manufacturers offering equivalent products:
  - 1. CertainTeed.
  - 2. Knauf.
  - 3. Owens-Corning.
  - 4. Substitutions: Refer to Section 23 05 00.
- C. Insulation: ASTM C553; flexible, noncombustible blanket.
  - 1. ‘K’ value : .24 at 75 degrees F.
  - 2. Maximum service temperature: 450 degrees F unfaced side, 150 degrees F faced side.
  - 3. Maximum moisture absorption: less than 5 percent by weight.
- D. Vapor Barrier Jacket:
  - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
  - 2. Moisture vapor transmission: 0.02 perm.
  - 3. Secure with pressure sensitive tape.
- E. Vapor Barrier Tape:
  - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

### **2.2 GLASS FIBER, RIGID**

- A. Manufacturer: Schuller-Manville 800 Series Spin-Glas.
- B. Other acceptable manufacturers offering equivalent products:
  - 1. CertainTeed.
  - 2. Knauf.
  - 3. Owens-Corning.
  - 4. Substitutions: Refer to Section 23 05 00.
- C. Insulation: ASTM C612; rigid, noncombustible blanket.

1. 'K' value : 0.24 at 75 degrees F.
  2. Maximum service temperature: 450 degrees F unfaced side, 150 degrees F faced side.
  3. Maximum moisture absorption: less than 1% by volume.
  4. Density: 3.0 lb/cu ft.
- D. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
  2. Moisture vapor transmission: 0.02 perm.
  3. Secure with pressure sensitive tape.
- E. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that ductwork has been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

#### **3.2 INSTALLATION**

- A. Install in accordance with NAIMA National Insulation Standards.
- B. Insulate ductwork conveying air below ambient temperature:
  1. Provide insulation with vapor barrier jackets.
  2. Finish with tape and vapor barrier jacket.
  3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
  4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- C. Insulated ductwork conveying air above ambient temperature:
  1. Provide with or without standard vapor barrier jacket.
  2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- D. External Duct Insulation Application:
  1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
  2. Secure insulation without vapor barrier with staples, tape, or wires.
  3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
  4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
  5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

#### **3.3 SCHEDULES**

- A. Outside Air, Mixed Air, Relief and Exhaust Ducts – Exposed:
  1. Rigid Glass Fiber - external: 1-1/2 inch thick.

B. Return Ducts:

1. Rigid Glass Fiber – external: 1 inch thick.

C. Supply Ducts - Concealed:

1. Flexible Glass Fiber Blanket - external: 1-1/2 inches thick.

D. Supply Ducts – Exposed:

1. Rigid Glass Fiber - external: 1 inch thick.

E. Supply and Exhaust Ducts – (in attic and inside of soffits).

1. Flexible Glass Fiber Blanket - external: 2 inch thick.

**END OF SECTION**

**SECTION 23 31 13**  
**METAL AND NON-METAL DUCTWORK, CASING AND PLENUMS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

A. Metal ductwork.

**1.2 RELATED SECTIONS**

- A. Section 23 05 00 – Common Work Results for HVAC Equipment.
- B. Section 23 05 29 - Hangers and Supports for HVAC Piping, Ductwork and Equipment: Sleeves.
- C. Section 23 07 13 - Duct Insulation: External insulation.
- D. Section 23 33 13 - Ductwork Accessories.
- E. Section 23 37 13 - Air Inlets and Outlets.
- F. Section 23 05 93- Testing, Adjusting and Balancing.

**1.3 REFERENCES**

- A. ASTM A 525 - General Requirements for Steel Sheet, Zinc- Coated (Galvanized) by the Hot-Dip Process.
- B. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
- C. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- D. SMACNA - HVAC Air Duct Leakage Test Manual.
- E. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- F. UL 181 - Factory-Made Air Ducts and Connectors.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 23 05 00.
- B. Shop Drawings: Indicate construction methods including; duct materials, gages, reinforcing and sealing, fittings, hangers and supports.
- C. Manufacturer's Installation Instructions: Indicate special procedures for glass fiber ducts.

**1.5 PROJECT RECORD DOCUMENTS**

- A. Submit under provisions of Section 23 05 00.
- B. Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

**1.6 QUALITY ASSURANCE**

- A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible, unless more stringent requirements are noted herein.

**1.7 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum ten years documented experience.

## **1.8 REGULATORY REQUIREMENTS**

- A. Perform Work in accordance with NFPA 90B standards.
- B. Perform Work in accordance with International Mechanical Code with Minnesota Amendments.
- C. Perform Work in accordance with Minnesota Energy Code.
- D. Perform Work in accordance with State and Local Code requirements.

## **1.9 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures during and after installation of duct sealants.

## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- A. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G60 zinc coating of in conformance with ASTM A90.
- B. Fasteners: Rivets, bolts, or sheet metal screws.
- C. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- D. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

### **2.2 DUCTWORK FABRICATION**

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Comply with requirements of International Mechanical Code with Minnesota Amendments, when more stringent than those contained herein.
- B. When operating pressures are not indicated on the drawings, construct the entire duct system for the fan outlet pressure.
- C. Duct sealing requirements:
  - 1. SMACNA Seal Class "B";
    - a. Entire duct system where fan is rated from (+/-) 1 inch to (+/-) 2 inches water column external static pressure, unless noted otherwise.
    - b. Duct system enclosed in shafts or above inaccessible ceilings where fan is rated less than (+/-) 1 water column external static pressure.
  - 2. SMACNA Seal Class "C";
    - a. Entire duct system where fan is rated at less than (+/-) 1 inch water column external static pressure, except gravity transfer ducts, and exhaust ducts discharging into ceiling plenum.
- D. Duct sealing on ductwork in unconditioned attic space:
  - 1. Seal entire system including all joints and seams.
- E. Portions of duct system with width or height dimension greater than 18 inches which are required to be constructed to SMACNA Seal Class "A" or "B", shall utilize transverse duct connection system.



- F. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.
- G. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- H. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- I. Rigidly construct ducts with joints mechanically tight, braced and stiffened to not breathe, rattle, vibrate or sag. Caulk duct joints and connections with sealant as ducts are being assembled.
- J. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.
- K. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
- L. All exposed ductwork shall be coated with paint grip primer.

### **2.3 MANUFACTURED DUCTWORK AND FITTINGS**

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, International Mechanical Code with Minnesota Amendments, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Single Wall Spiral Round Ducts:
  - 1. Manufacturers:
    - a. Semco.
    - b. Sheet Metal Connectors.
    - c. United McGill
    - d. Substitutions: Refer to section 23 05 00
- C. Machine made from round 4 ply spiral lockseam duct. All exposed ductwork shall be coated with paint grip primer.
- D. Transverse Duct Connection System:
  - 1. Manufacturers:
    - a. Ductmate.
    - b. EZ Flange.
    - c. TDC.
    - d. Ward.
    - e. Substitutions: Refer to Section 23 05 00.
  - 2. SMACNA "F" rated or SMACNA "J" rated rigidly class connection, interlocking angle and duct edge connection system with sealant, gasket, bolts, cleats, and corner clips.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, unless more stringent requirements are noted herein. Comply with requirements of International Mechanical Code with Minnesota Amendments, when more stringent than those contained herein
- C. Install duct as high as possible to maintain headroom.
- D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- E. Duct sizes are inside clear dimensions.
- F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- G. Install round branch duct to rectangular mains with conical, bellmouth or flared spin-in fittings.
- H. Make tee connections with a radius tap-in unless noted otherwise.
- I. Lap metal ducts in direction of air flow. Hammer down edges of slips and drives with duct mastic in corners to leave smooth duct interior and a tight fitting corner.
- J. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- K. Use double nuts and lock washers on threaded rod supports.
- L. Pack space between duct and wall, ceiling or floor with glasswool. Fill with 1/2 inch sealing compound. In rated walls, ceilings or floors, use fire rated sealing compound.
- M. Coordinate location of duct access panels with wall or ceiling access doors.
- N. Duct hangers shall not attach to bottom chord of steel joist or metal roof decking. Attach to top chord of steel joist.
- O. Provide adequate access into ductwork for cleaning purposes.
- P. Elbows and angles for spiral ductwork shall be five piece standing seam construction, 18 gauge with 1 full sweep (C.L. Radius = 1.5 x Diameter) unless physical space is not available.
- Q. Provide short radius 90 degree elbows with turning vanes as indicated on the drawings. Short radius elbow with turning banes shall be constructed in accordance to SMACNA 1995 standards, appendices A-41 and A-43. Construct elbow with six (6) inch inside radius for ducts up to 48 inches wide and twelve (12) inches for ducts 48 inches and over. No exceptions unless approved by the engineer.

### **3.2 FLEXIBLE DUCTS**

- A. Connect diffusers to low pressure ducts directly or with 3 feet maximum length of flexible duct held in place with strap or clamp.
- B. Connect flexible ducts to metal ducts with draw bands and additional sealing to provide air tight joint.
- C. Support flexible duct properly to avoid sags and crimping.
- D. Do not use flexible duct to change direction.

### **3.3 PROTECTION**

- A. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

**END OF SECTION**



**SECTION 23 33 13**  
**DUCTWORK ACCESSORIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Duct access doors.
- B. Duct test holes.
- C. Flexible duct connections.
- D. Volume control dampers.

**1.2 RELATED SECTIONS**

- A. Section 23 05 00 – Common Work Results for HVAC Equipment.
- B. Section 23 31 13 – Metal and Non-Metal Ductwork, Casings and Plenums.

**1.3 REFERENCES**

- A. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- B. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

**1.4 SUBMITTALS**

- A. Submit under provisions of Section 23 05 00.

**1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 23 05 00: Procedures for submittals.
- B. Project Record Documents: Record actual locations of components and instrumentation.
- C. Operation and Maintenance Data: Include instructions for calibrating instruments.

**1.6 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

**1.7 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install instruments when areas are under construction, except for required rough-in, taps, supports and test plugs.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Protect dampers from damage to operating linkages and blades.

**PART 2 PRODUCTS**

**2.1 DUCT ACCESS DOORS**

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum 1 inch thick insulation with sheet metal cover.
  - 1. Less Than 12 inches Square: Secure with sash locks.
  - 2. Up to 18 inches Square: Provide two hinges and two sash locks.

3. Larger Sizes: Provide an additional hinge.

C. Access doors with sheet metal screw fasteners are not acceptable.

## **2.2 DUCT TEST HOLES**

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

## **2.3 FLEXIBLE DUCT CONNECTIONS**

A. Manufacturers:

1. Ventfabrics.
2. Substitutions: Refer to Section 23 05 00.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Connector: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
2. Net Fabric Width: Approximately 3 wide.
3. Metal: 3 inches wide, 24 gage thick, galvanized steel.

## **2.4 VOLUME CONTROL DAMPERS.**

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Splitter Dampers:

1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.
4. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

D. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

E. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches provide regulator at both ends.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Verify that electric power is available and of the correct characteristics.

### **3.2 INSTALLATION**

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 13 for duct construction and pressure class.
- B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment, and supported by vibration isolators.
- E. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- F. Use splitter dampers only where indicated.
- G. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

**END OF SECTION**





**SECTION 23 37 13**  
**AIR OUTLETS AND INLETS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

A. Grilles, registers and diffusers.

**1.2 RELATED SECTIONS**

A. Section 23 05 00 - Common Work Results for HVAC Equipment.

B. Section 23 31 13 – Metal and Non-Metal Ductwork.

C. Section 23 33 13 - Ductwork Accessories.

**1.3 REFERENCES**

A. ADC 1062 - Certification, Rating and Test Manual.

B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.

C. ARI 650 - Air Outlets and Inlets.

D. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

E. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

**1.4 SUBMITTALS**

A. Submit under provisions of Section 23 05 00.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

**1.5 PROJECT RECORD DOCUMENTS**

A. Submit under provisions of Section 23 05 00.

B. Record actual locations of air outlets and inlets.

**1.6 QUALITY ASSURANCE**

A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.

B. Test and rate louver performance in accordance with AMCA 500.

**1.7 QUALIFICATIONS**

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

**PART 2 PRODUCTS**

**2.1 GRILLES, REGISTERS AND DIFFUSERS**

A. Manufacturers:

1. Price.

2. Titus.

3. Tuttle & Bailey.
  4. Substitutions: None.
- B. Refer to Schedule on drawings for type, frame, fabrication, finish and accessories.

### **PART 3 EXECUTION**

#### **3.1 GRILLES, REGISTERS AND DIFFUSERS**

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Rigidly fasten grilles, registers and diffusers to duct.
- D. Install grilles, registers and diffusers to ductwork with air tight connection.
- E. Adjust directional tabs in square diffusers and in linear diffusers to provide proper air distribution pattern.
- F. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

**END OF SECTION**

## **SECTION 23 54 00**

### **FURNACES**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Forced air furnaces.
- B. Energy recovery unit.
- C. Evaporator cooling coil section.
- D. Controls.

##### **1.2 RELATED SECTIONS**

- A. Section 23 05 13 – Common Motor Requirements for HVAC Equipment.
- B. Section 23 05 48 – Vibration and Seismic Controls for HVAC Piping and Equipment.
- C. Section 23 07 13 - Ductwork Insulation.
- D. Section 25 35 00 – Integrated Automation Instrumentation and Terminal Devices for HVAC.

##### **1.3 REFERENCES**

- A. ASHRAE 52 - Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
- B. ASHRAE 90A - Energy Conservation in New Building Design.
- C. ASHRAE 103 - Heating Seasonal Efficiency of Central Furnaces and Boilers, Methods of Testing.
- D. NEMA MG 1 - Motors and Generators.
- E. NFPA 54 (AGA Z223.1) - National Fuel Gas Code.
- F. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.

##### **1.4 SUBMITTALS FOR REVIEW**

- A. Section 23 05 00 - Submittals: Procedures for submittals.
- B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
- D. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

##### **1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Section 23 05 00 - Procedures for submittals.
- B. Project Record Documents: Record actual locations of components and connections.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- D. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owners name and registered with manufacturer.

##### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

- B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

## **1.7 REGULATORY REQUIREMENTS**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

## **1.8 WARRANTY**

- A. Section 23 05 00 - Warranties.

## **1.9 EXTRA MATERIALS**

- A. Provide two sets of filters for each furnace and Heat recovery Unit.

## **PART 2 PRODUCTS**

### **2.1 GAS FIRED FURNACES**

- A. Manufacturer:

1. Airtemp.
2. Carrier.
3. Lennox.
4. York.
5. Bryant.
6. Heil.

7. Substitutions: None.

- B. Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, gas furnace, controls, air filter, and accessories; wired for single power connection with control transformer.

1. Air Flow Configuration: Upflow.
2. Heating: Natural gas fired, condensing type.
3. Refer to schedule on drawings for capacities.

- C. Evaporator cooling coil discharge section: Provide furnace unit complete with a discharge 'A'-type configuration cooling coil section. Coil section to be the same manufacturer of the furnace unit. Provide all plumbing from the coil condensate connection to the floor drain.

- D. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner. For counterflow units, provide additive steel base.

- E. Supply Fan: Centrifugal type rubber mounted with ECM direct drive multiple speeds.

- F. Motor: Electronically commutated motor variable speed.

- G. Heat Exchanger: Primary and secondary heat exchanger, all components mounted in heavy gauge steel frame.

- H. Flue Condensate Trap Assembly: Flue assembly connects to flue pipe with one piece no hub connector and to induced draft blower. Contains built-in internal trap and removable boot for servicing.

- I. Header Box Condensate Trap: Located on end of condenser coil, contains built-in trap and removable boot for servicing. Adapter and nipple for field installation to extend drain out either side of cabinet.
- J. Gas Burner: Aluminized steel inshot type. Burner venturi mixes air and gas for proper operation. Enclosed in heavy gauge steel burner box. Sight glass for observation.
- K. Ignition: Line voltage power heat igniter.
- L. Integrated Control Board: Solid state board contains all necessary controls and relays to operate furnace. Pre-purge and post-purge cycles. Monitor and adjust igniter voltage. Electronic flame sensor. Adjustable blower timed-off delay. LED's to indicate status and as aid for troubleshooting.
- M. Induced Draft Blower: Pre-purges heat exchanger and safely vents combustion products. Shaded pole motor thermally protected. Pressure safety switch.
- N. Automatic Gas Control: Provide 100% shut-off. 24 volt redundant combination gas control valve with safety pilot, manual shut off, pilot filtration, automatic electric valve, and gas pressure regulation. Automatically regulated with pressure switch to maintain even gas flow. Gas valve to be fully modulating between 40% to 100%.
- O. Limit Control: Protects against abnormal operating conditions.
- P. Field Wiring Make-up Box: Plug-in connection for power supply wiring, wire for 120 volt accessory connection for field installation.
- Q. Control Box: Contains terminals for thermostat, safety interlock switch, blower/ignition control board, control transformer and circuit breaker.
- R. Operating Controls
  - 1. Provide Infinity Touch Control Wi-Fi fully programmable 7-day thermostat and controller. System to control energy recovery ventilator, furnace and air cooled condensing unit. Program to modulate fan and burner operation and to interlock energy recovery ventilator set to connect to Owners Wi-Fi. Provide Owner training for operation and scheduling. Provide all wiring as required for controls.
- S. Accessories:
  - 1. Filter and Rack Kit.
  - 2. Wall combustion air termination kit.
  - 3. Provide acid neutralization kit and pipe condensate to floor drain on furnace.
- T. Performance:
  - 1. Refer to Schedule on Drawings. Gas heating capacities are sea level ratings.

## **2.2 ENERGY RECOVERY VENTILATOR**

- A. Manufacturer:
  - 1. Venmar.
  - 2. RenewAire.
  - 3. Substitution: None.
- B. Energy Recovery Ventilator (ERV) shall be a packaged unit and shall transfer both heat and humidity using static plate core technology and have a single point electrical connection.
- C. Quality Assurance:
  - 1. Unit shall be Listed under UL 1812 Standard for Ducted Air to Air Heat Exchangers. (Note that a few low volume product or product configurations are not UL Listed.)

2. The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of one year from the date of purchase.

D. Energy Transfer:

1. The ERV shall be capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one air stream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.

E. Frost Control:

1. Temperature initiated at 23<sup>o</sup> time based. Exhaust fan will be circulated and supply fan is off.

F. Positive Airstream Separation:

1. Water vapor transfer shall be through molecular transport by hydroscopic resin and shall not be accomplished by "porous plate" mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix.

G. Construction:

1. The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts.
2. The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc plated screw fasteners.
3. Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets.
4. Case walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers.
5. The ERV cores shall be protected by a MERV-8 rated, 2" nominal, pleated, disposable filter in both airstreams.
6. Unit shall have single-point power connection and a single-point 24 VAC contactor control connection. (Except Inverter Ready units that have terminal connections for an independent inverter for each air stream.)
7. Blower motors shall be EPACT compliant for energy efficiency and be thermally protected or supplied with external starters.
8. Blowers shall be quiet running, forward curve type and be either direct drive or belt drive. HE6X and HE8X units use backward incline, belt drive blower packages. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for proper belt tensioning.
9. Provide factory installed transformer/relay package to supply a 24VAC power source.
10. Provide factory installed filter monitors for each airstream.
11. Provide throwaway-type air filters for each airstream.

H. Installation:

1. Provide rubber or spring type isolators appropriately sized for corner weights of the specific unit.
2. Provide flexible duct connections at unit duct flanges.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that floors are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available for furnace.
- C. Verify that proper fuel supply is available for connection.
- D. Verify that water supply is available for humidifier.

### **3.2 INSTALLATION**

- A. Install in accordance with NFPA 90B.
- B. Install gas fired furnaces in accordance with ANSI Z223.1 (NFPA 54).
- C. Provide vent connections in accordance with NFPA 211.
- D. Provide condensate drains and neutralization kit for condensing furnace, pipe to floor drain.
- E. Provide condensate drains from energy recovery ventilator and pipe to floor drain.
- F. Sequence:
  - 1. Occupied: Energy recovery unit and gas furnace to be energized. Burner and fan to modulate to maintain space temperature.
  - 2. Unoccupied: Energy recover unit to be off and furnace to cycle to maintain a reduced space temperature.

**END OF SECTION**





## **SECTION 23 62 13**

### **PACKAGED AIR COOLED REFRIGERANT COMPRESSORS AND CONDENSER UNITS**

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

A. Light Commercial Air Cooled Condensing Units.

##### **1.2 RELATED SECTIONS**

A. Section 23 05 13 – Common Motor Requirements for HVAC Equipment.

B. Section 23 54 00 - Furnaces.

##### **1.3 REFERENCES**

A. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

B. ARI 270 - Sound Rating of Outdoor Unitary Equipment.

C. ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units.

D. ASHRAE 14 - Methods of Testing for Rating Positive Displacement Condensing Units.

E. ASHRAE 15 - Safety Code for Mechanical Refrigeration.

F. ASHRAE 90A - Energy Conservation in new Building Design.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

H. NEMA MG 1 - Motors and Generators.

I. UL 207 - Refrigerant-Containing Components and Accessories, Non-Electrical.

J. UL 303 - Refrigeration and Air-Conditioning Condensing, and Air-Source Heat Pump Equipment.

##### **1.4 SUBMITTALS FOR REVIEW**

A. Section 23 05 00 - Submittals: Procedures for submittals.

B. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Include schematic layouts showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system.

C. Product Data: Provide rated capacities, weights specialties and accessories, electrical nameplate data, and wiring diagrams. Submit condensing unit and coil or evaporator, matched capacity curves, to ensure capacities are complementary.

D. Design Data: Indicate pipe and equipment sizing.

E. Submit manufacturer's installation instructions.

##### **1.5 SUBMITTALS AT PROJECT CLOSEOUT**

A. Section 23 05 00 - Project Closeout.

B. Operation and Maintenance Data: Include start-up instructions, maintenance instructions, parts lists, controls, and accessories.

##### **1.6 REGULATORY REQUIREMENTS**

A. Comply with ANSI/ASHRAE 15 Safety Code.

- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., ETL, CSA as suitable for the purpose specified and indicated.

### **1.7 DELIVERY, STORAGE, AND PROTECTION**

- A. Transport, handle, store, and protect products.
- B. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- C. Protect units on site from physical damage. Protect coils.

### **1.8 WARRANTY**

- A. Section 23 05 00 - Warranties.
- B. Provide a five year warranty to include coverage for refrigerant compressors.

## **PART 2 PRODUCTS**

### **2.1 RESIDENTIAL/LIGHT COMMERCIAL AIR COOLED CONDENSING UNITS**

#### **A. Manufacturers**

1. Nortek.
2. Carrier.
3. Lennox.
4. York.
5. Bryant.
6. Heil.
7. Substitutions: None.

#### **B. Manufactured Units**

1. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, and screen coil guards.
2. Construction and Ratings: In accordance with ARI 210/240, or 365. Testing shall be in accordance with ASHRAE 14.
3. Performance Ratings: Energy Efficiency Rating (EER) not less than prescribed by ASHRAE 90A or the Minnesota Energy Code.

#### **C. Casing**

1. House components in steel galvanized frame with galvanized steel panels with weather resistant, baked enamel finish.
2. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.
3. Provide removable access doors or panels with quick fasteners.

#### **D. Condenser Coils**

1. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Pressure leak tested. Seal with holding charge of refrigerant.
2. Hail Coil Guard: Louvered heavy gauge steel.

#### **E. Fans and Motors**

1. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge.
2. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection.
3. Motors as indicated, in compliance with Section 23 05 13.

#### F. Compressors

1. Compressor: Digital scroll type, suction cooled.
2. Mounting: Statically and dynamically balance rotating parts and mount on vibration isolators.
3. Overload protected, internal excessive current and temperature protection.
4. Crankcase heater.

#### G. Refrigerant Circuit

1. Provide each unit with one or two refrigerant circuits, factory supplied and piped.
2. For each refrigerant circuit, provide; liquid and suction line service valves, gauge ports, hi-capacity drier (field installed), thermometer well, high pressure switch, low pressure switch, and timed-off control.

#### H. Controls

1. On unit, mount weatherproof steel control panel, containing power and control wiring, factory wired with single point power connection.
2. Provide starter, non-recycling compressor overload, starter relay, and control power transformer. Provide manual reset current overload protection. For each condenser fan, provide across-the-line starter with starter relay.
3. Provide safety controls arranged so any one will shut down machine:
4. Gages: Pre-piped for suction and discharge refrigerant pressures and oil pressure for each compressor.

#### I. Accessories

1. Thermostat.
2. Expansion valve kits.
3. Low ambient kit allowing operating down to 30F.
4. Refrigerant line kits.
5. Timed-off control.
6. Stand-off kit - black high density polyethylene feet to raise unit off mounting surface.
7. Mounting base - high density polyethylene mounting base to provide permanent foundation.

#### J. Performance and Electrical Characteristics

1. Refer to Schedule on Drawings.

#### K. Electrical

1. Single point power connection.
2. Disconnect Switch.
3. Starters.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- A. Install in accordance with manufacturer's installation instructions.
- B. Provide services of factory authorized representative at system start-up.
- C. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.
- D. Install hot gas bypass valve and piping when not factory installed.
- E. Provide for single point connection of electrical service by Division 26.
- F. Install units on vibration isolation. Refer to Section 23 05 48.
- G. Install units on concrete base.
- H. Provide connection to refrigeration piping system and evaporators. Comply with ASHRAE 15.
- I. Furnish charge of refrigerant and oil.

### **3.2 DEMONSTRATION AND INSTRUCTIONS**

- A. Section 23 05 00 - Demonstration and Project Closeout: Demonstrating installed work.
- B. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.
- C. Charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.
- D. Shut-down system if initial start-up and testing takes place in winter and machines are to remain inoperative. Repeat start-up and testing operation at beginning of first cooling season.
- E. Provide cooling season start-up, and winter season shut-down for first year of operation.

**END OF SECTION**

**SECTION 31 22 00**  
**GRADING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Removal of topsoil.
- B. Rough grading the site.
- C. Finish grading.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 23 16 - Excavation.
- B. Section 31 23 23 - Fill: Filling and compaction.

**1.03 QUALITY ASSURANCE**

- A. Perform Work in accordance with State of Minnesota, Highway Department standards.

**1.04 PROJECT CONDITIONS**

- A. Protect plants, lawns, and other features to remain as a portion of final landscaping.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Topsoil: See Section 31 23 23.
- B. Other Fill Materials: See Section 31 23 23.
- C. Erosion Control: Contractor shall conform to the requirements of MNDOT 1803.5 for Erosion control and shall furnish all materials necessary to conform to these requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

**3.03 ROUGH GRADING**

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. See Section 31 23 23 for filling procedures.
- G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

**3.04 SOIL REMOVAL**

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
- B. Stockpile subsoil to be re-used on site; remove remainder from site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

### **3.05 FINISH GRADING**

- A. Before Finish Grading:
  - 1. Verify building and trench backfilling have been inspected.
  - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 3 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- E. Place topsoil where required to level finish grade.
- F. Place topsoil to the following compacted thicknesses:
  - 1. Areas to be Sodded: 4 inches.
- G. Place topsoil during dry weather.
- H. Remove roots, weeds, rocks, and foreign material while spreading.
- I. Near plants and buildings spread topsoil manually to prevent damage.
- J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- K. Lightly compact placed topsoil.

### **3.06 TOLERANCES**

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).
- C. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.
- D. Top Surface of Finish Grade: Plus or minus 1/2 inch.

### **3.07 FIELD QUALITY CONTROL**

- A. See Section 31 23 23 for compaction density testing.

### **3.08 CLEANING**

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

**END OF SECTION**

**SECTION 31 23 16**  
**EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for footings, slabs-on-grade, and paving.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 23 23 - Fill: Fill materials, filling, and compacting.

**1.03 PROJECT CONDITIONS**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Protect plants, lawns, and other features to remain.
- C. Protect bench marks, survey control points, existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 22 00 for additional requirements.
- C. Locate, identify, and protect utilities that remain and protect from damage.

**3.02 EXCAVATING**

- A. Excavate to accommodate new structures and construction operations.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Cut utility trenches wide enough to allow inspection of installed utilities.
- F. Hand trim excavations. Remove loose matter.
- G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
- H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 23 23.
- I. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- J. Remove excavated material that is unsuitable for re-use from site.
- K. Remove excess excavated material from site.

**3.03 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

**3.04 PROTECTION**

- A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

**END OF SECTION**





## SECTION 31 23 23

### FILL

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for footings and slabs-on-grade.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

##### 1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 31 22 00 - Grading: Site grading.
- C. Section 31 23 16 - Excavation: Removal and handling of soil to be re-used.

##### 1.03 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.
- B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.
- C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2012.
- E. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.
- F. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

##### 1.04 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

##### 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: 10 lb sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction Density Test Reports.

##### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

##### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.

#### PART 2 PRODUCTS

##### 2.01 FILL MATERIALS

- A. General Fill - Fill Type backfill on site: Subsoil excavated on-site.
  - 1. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

2. Exterior backfill material shall be excavated material free from concrete, brick, broken masonry, stone, rock, wood, clay lumps, frozen earth, soft and unstable material which does not compact readily by tamping and rolling.
- B. Granular Fill - Gravel: pipe bedding and encasement stone and sand; free of shale, clay, friable material and debris.
    1. Graded in accordance with ASTM D2487 Group Symbol.
      - a. 1 inch sieve: 100 percent passing
      - b. 3/4 inch sieve: 90 - 100 percent passing.
      - c. 3/8 inch sieve: 50 to 90 percent passing.
      - d. No. 4 sieve: 35 to 80 percent passing.
      - e. No. 10 sieve: 20 - 65 percent passing.
      - f. No. 40 sieve: 0 - 35 percent passing.
      - g. No. 200 sieve: 0 to 10 percent passing.
  - C. Sand - Fill Type below concrete slabs on grade, interior and exterior side of foundations: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
    1. Graded in accordance with ASTM C136/C136M; within the following limits:
      - a. No. 4 sieve: 100 percent passing.
      - b. 10 sieve: 90 to 100 percent passing.
      - c. 40 sieve: 0 to 50 percent passing.
      - d. No. 200 sieve: 0 to 8 percent passing.
  - D. Course Filter Aggregate - Fill Type at Drintile: Free draining mineral product excluding crushed carbonate quarry rock, crushed concrete, and salvaged bituminous mixture.
    1. Graded in accordance with MnDOT Section 3149 as follows:
      - a. 1 inch sieve: 100 percent passing.
      - b. 3/4 inch sieve: 85 - 100 percent passing.
      - c. 3/8 inch sieve: 30 - 60 percent passing.
      - d. No. 4 sieve: 0 - 10 percent passing.
  - E. Topsoil - Fill Type Planting and Lawn areas: Topsoil excavated on-site.
    1. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
    2. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

## **2.02 ACCESSORIES**

- A. Geotextile Fabric: Non-biodegradable, woven, Type I as per MNDOT Section 3733.

## **2.03 SOURCE QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 22 00 for additional requirements.
- C. Verify structural ability of unsupported walls to support imposed loads by the fill.

### **3.02 PREPARATION**

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
  - 1. Load-bearing foundation surfaces: Fill with concrete.
  - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
  - 1. At floor slab: 95 percent of maximum dry density.
  - 2. At other locations: 95 percent of maximum dry density.
  - 3. Compaction shall be measured by the Modified Procter Density.
- J. Reshape and re-compact fills subjected to vehicular traffic.

### **3.04 FILL AT SPECIFIC LOCATIONS**

- A. Under Interior Slabs-On-Grade (Vapor Barrier above aggregate):
  - 1. Use Sand.
  - 2. Depth: 6 inches deep.
  - 3. Compact to 95 percent of maximum dry density.
- B. At interior and exterior side of Foundation Walls:
  - 1. Use Sand.
  - 2. Fill up to subgrade elevation.
  - 3. Lift height: 8 inches.
  - 4. Compact each lift to 95 percent of maximum dry density.
  - 5. Do not backfill against unsupported foundation walls.
  - 6. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- C. Over Subdrainage Piping at Foundation Perimeter:
  - 1. Drainage fill, course filter aggregate, and geotextile fabric:
  - 2. Cover drainage fill with sand.
  - 3. Fill up to 12 inches each side.
  - 4. Compact to 95 percent of maximum dry density.
- D. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
  - 1. Bedding: Use granular fill.
  - 2. Cover with granular fill.
  - 3. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.
- E. At Lawn Areas:
  - 1. Use general fill.
  - 2. Fill up to 4 inches below finish grade elevations.
  - 3. Fill up to subgrade elevations.

4. Compact to 90 percent of maximum dry density.
5. See Section 31 22 00 for topsoil placement.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556 or ASTM D2922.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor") or AASHTO T 180.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests:
  1. Under Foundations:
    - a. 2500 psf or less, fill depths less than 8 feet: 95%, Test every 2500 sq. ft. per lift.
  2. Under Slabs, sands cushion:
    - a. Less than 10 feet below grade: 95%, test every 2500 sq. ft. per lift.
  3. Wall Backfill:
    - a. 0 - 12 feet below grade, 95%, test every 75 feet on center for every 2 feet of thickness, each lift shall be 8 inches in depth.
  4. Utilities:
    - a. Above Invert, compaction dependent on area of placement, 75 feet on center.
    - b. Below Invert, 95%, 75 feet on center.
  5. Unpaved Areas: 90% Every 7500 sq. ft.
- F. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

### **3.06 CLEANING**

- A. Follow guidelines for Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

**END OF SECTION**

**SECTION 33 46 00**  
**SUBDRAINAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Building Perimeter Drainage Systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 23 16 - Excavation: Excavating for subdrainage system piping and surrounding filter aggregate.
- B. Section 31 23 23 - Fill: Backfilling over filter aggregate, up to subgrade elevation.

**1.03 REFERENCE STANDARDS**

- A. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pipe drainage products, and pipe accessories.

**PART 2 PRODUCTS**

**2.01 PIPE MATERIALS**

- A. Corrugated Plastic Tubing: Flexible type; 4 inch diameter, with required fittings. Drainage piping shall be furnished with an integral soil sock.
- B. Use perforated pipe at subdrainage system; unperforated through sleeved walls.

**2.02 AGGREGATE AND BEDDING**

- A. Filter Aggregate and Bedding Material: Granular fill as specified in Section 31 23 23.

**2.03 ACCESSORIES**

- A. Pipe Couplings: Solid plastic.
- B. Sleeve: Schedule 40 steel pipe type for footing.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Hand trim excavations to required elevations. Correct over-excavation with sand fill.
- B. Remove large stones or other hard matter that could damage drainage piping or impede consistent backfilling or compaction.

**3.02 INSTALLATION - DRAINAGE PIPE**

- A. Install and join pipe and pipe fittings in accordance with pipe manufacturer's instructions.
- B. Place drainage pipe on clean cut subsoil.
- C. Lay pipe to slope gradients noted on Drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Place pipe with perforations facing down. Mechanically join pipe ends.
- E. Install pipe couplings.
- F. Install filter aggregate at sides, over joint covers and top of pipe. Provide top cover compacted thickness of 12 inches.
- G. Place aggregate in maximum 4 inch lifts, consolidating each lift.
- H. Refer to Section 31 23 23 for compaction requirements. Do not displace or damage pipe when compacting.
- I. Connect to sump pits with unperforated pipe, through installed sleeves.

J. Connect to existing drain tile where new drain tile intersects existing systems.

**3.03 PROTECTION**

A. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

**END OF SECTION**

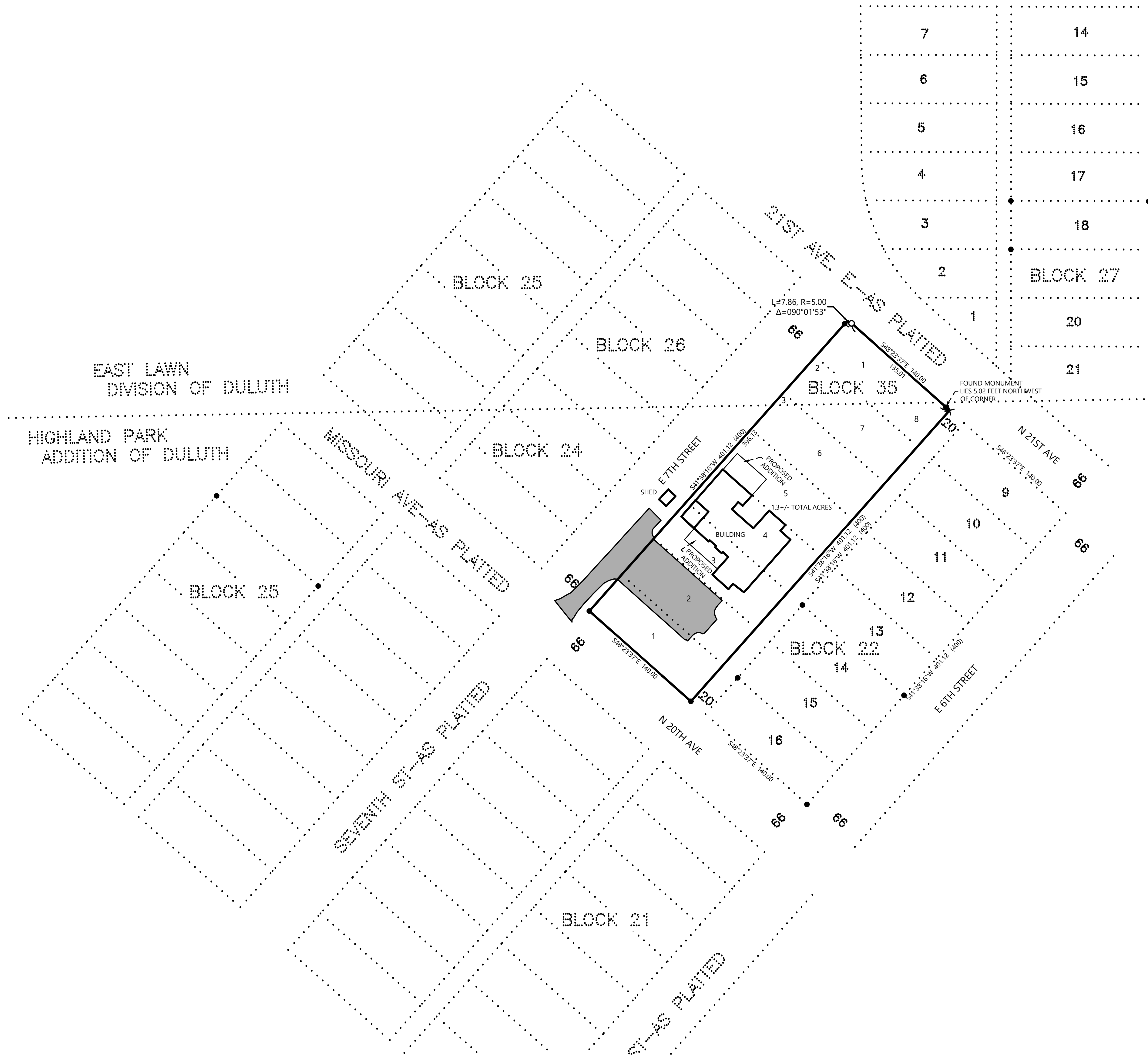






# CERTIFICATE OF SURVEY

PART OF SECTION 14,  
TOWNSHIP 50 NORTH, RANGE 14 WEST,  
ST. LOUIS COUNTY, MINNESOTA



7	14
6	15
5	16
4	17
3	18
2	19
1	20
	21

### EXISTING DESCRIPTION:

Office of the  
Registrar of Titles  
St. Louis County, Minnesota  
Certified Filed on  
07/05/2016 at 12:50PM as  
**Document No. 972736.0**  
Affecting Certificate(s) of Title  
339479.0  
**Mark A. Monacelli**  
Registrar of Titles  
By: M Binder, Deputy  
TFR 263868

972736  
1288020

**TA**

DO NOT REMOVE

**QUIT CLAIM DEED**  
Business Entity to Business Entity  
Minnesota Uniform Conveyancing Blanks  
Form 10.3.5 (2013)

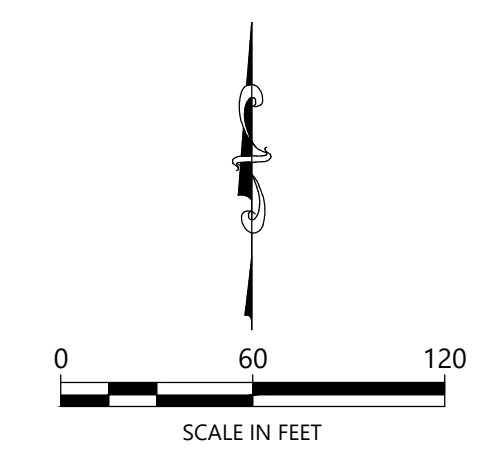
eCRV number: N/A  
DEED TAX DUE \$1.65 DATE: June 15, 2016.

FOR VALUABLE CONSIDERATION, SAFE HAVEN SHELTER FOR BATTERED WOMEN, formerly known as Women's Coalition, Inc., a corporation under the laws of the State of Minnesota, Grantor, hereby conveys and quitclaims to SAFE HAVEN SHELTER FOR BATTERED WOMEN, a corporation under the laws of the State of Minnesota, Grantee, real property in St. Louis County, Minnesota, described as follows:

-See Attached Exhibit A-

972736  
1288020  
EXHIBIT A

Lots 1, 2, 3, 4, 5, 6, 7 and 8, Block 22, HIGHLAND PARK ADDITION TO DULUTH. 10-2220-1380 x  
Lots 1, 2 and 3, Block 35, EAST LAWN DIVISION OF DULUTH. 10-1380-3940 x



ORIENTATION OF THIS BEARING SYSTEM IS BASED ON ST. LOUIS COUNTY SOUTH ZONE COORDINATES.

### LEGEND

- DENOTES IRON MONUMENT SET & MARKED BY LICENSE NO. 42656
- DENOTES MONUMENT FOUND
- × DENOTES CALCULATED POSITION
- DENOTES EDGE OF EXISTING BITUMINOUS

### NOTES:

1. Zoning for subject tract = N/A.
2. Parcel ID for subject tract = 010-2220-01380 & 010-1380-03940.
3. Wetlands and improvements, other than those shown on this certificate, may exist that were not located during this survey.
4. All lines marked with flagging are only an approximation of the true boundary lines and are not to be used as an exact boundary location. Flagged lines should not be used for the establishment of improvements. To mark true boundary lines additional monumentation would be required.
5. Northern Engineering and Consulting, Inc. was not given nor has conducted a current title search for the subject property. Therefore the information contained in a title search may or may not be accurately shown on this certificate.

REVISIONS:	NO.	DATE	DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS SURVEY, PLAN OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

*Denise J. Warner*  
DENISE J. WARNER  
LIC. NO. 42656



CERTIFICATE OF SURVEY  
SAFE HAVEN SHELTER FOR BATTERED WOMEN  
PO BOX 3558  
DULUTH, MN 55803

JOB NO. 21-229  
DATE: 10-25-2021

SHEET NO.  
1 OF 1























GENERAL

ALL TYPICAL DETAILS AND NOTES SHOWN ON DRAWINGS SHALL APPLY UNLESS NOTED OTHERWISE. TYPICAL DETAILS MAY NOT NECESSARILY BE INDICATED ON THE PLANS BUT SHALL STILL APPLY AS SHOWN OR DESCRIBED IN THE DETAILS. WHERE TYPICAL DETAILS ARE NOTED ON THE DRAWINGS, THE SPECIFIED TYPICAL DETAIL SHALL BE USED. WHERE NO DETAIL IS NOTED, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CHOOSE THE APPROPRIATE TYPICAL DETAIL FROM THOSE PROVIDED. THE CONTRACTOR SHALL SUBMIT ALL PROPOSED ALTERNATE TYPICAL DETAILS TO THOSE PROVIDED WITH RELATED CALCULATIONS TO THE ENGINEER FOR APPROVAL PRIOR TO SHOP DRAWING PRODUCTION AND FIELD USE.

BUILDING CODE

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE BUILDING CODE. THE PUBLICATIONS LISTED BELOW ARE THE GOVERNING CODES AND STANDARDS AND ARE REFERENCED BY THEIR BASIC DESIGNATION. IN THE CASE OF CONFLICTING REQUIREMENTS, THE BUILDING CODE SHALL GOVERN.

APPLICABLE CODES AND STANDARDS

Table with columns: CODE, DESCRIPTION. Includes entries for INTERNATIONAL BUILDING CODE (IBC), AMERICAN CONCRETE INSTITUTE, MASONRY SOCIETY (TMS), AMERICAN SOCIETY OF CIVIL ENGINEERS, AMERICAN SOCIETY FOR TESTING AND MATERIALS, AMERICAN WELDING SOCIETY, NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION (NDS), INTERNATIONAL CODE COUNCIL - EVALUATION SERVICES (ICC).

STRUCTURAL DESIGN DATA

LOAD COMBINATIONS ARE IN ACCORDANCE WITH SECTION 1605 OF THE BUILDING CODE.

LIVE LOADS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE (SECTION 1607) OR AS NOTED ON THE PLANS.

SNOW LOADS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE (SECTION 1609).

GROUND SNOW LOAD: Pg = 60 PSF. IMPORTANCE FACTOR: Is = 1.0. SNOW EXPOSURE FACTOR: Ce = 1.0. THERMAL FACTOR: Ct = 1.1. FLAT-ROOF SNOW LOAD: Pf = 46.2 PSF.

WIND LOADS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE (SECTION 1609).

BASIC WIND SPEED: Vult = 106 MPH (3-SECOND GUST). Vasd = 82 MPH (3-SECOND GUST). RISK CATEGORY: II. ENCLOSURE CLASSIFICATION: ENCLOSED. INT. PRESSURE COEFFICIENT: GCpi = 0.18.

WIND COMPONENTS AND CLADDING DESIGN WIND PRESSURE FOR 10 FT^2 TRIBUTARY AREA. ROOF - ZONE 1 (INTERIOR) = +16 PSF / -34 PSF. ROOF - ZONE 2 = +16 PSF / -54 PSF (EDGE). -61 PSF (OVERHANG). ROOF - ZONE 3 = +16 PSF / -73 PSF (EDGE). -78 PSF (OVERHANG). WALL - ZONE 4 (INTERIOR) = +24 PSF / -26 PSF. WALL - ZONE 5 (CORNER) = +24 PSF / -32 PSF.

SEISMIC LOADS SHALL BE IN ACCORDANCE WITH THE BUILDING CODE (SECTION 1613).

BUILDING LOCATION: LATITUDE = 46.811°N, LONGITUDE = -92.080°W. OCCUPANCY CATEGORY: II. IMPORTANCE FACTOR: Ie = 1.0. SITE CLASS: D. MAPPED SPECTRAL ACCELERATION PARAMETERS: Ss = 0.041g, S1 = 0.016g.

SPECTRAL RESPONSE COEFFICIENTS: Sds = 0.044g, Sd1 = 0.025g. SEISMIC DESIGN CATEGORY: A.

LOAD PATH FOR LATERAL FORCES. LATERAL FORCES ARE CARRIED BY THE ROOF AND FLOOR DIAPHRAGMS TO THE SHEAR WALLS, BRACED FRAMES, MOMENT FRAMES, ETC. MOMENTS, SHEARS, AND ROTATIONAL FORCES ARE DELIVERED TO THE FOUNDATION BY THE SHEAR WALLS, BRACED FRAMES, MOMENT FRAMES, ETC. IN PROPORTION TO THEIR ABILITY TO RESIST LATERAL DEFORMATION.

CONCRETE

- 1. MIXING, BATCHING, TRANSPORTING, PLACING, AND CURING OF ALL CONCRETE... 2. ALL CONCRETE USED IN HORIZONTAL SURFACES EXPOSED TO THE WEATHER SHALL CONTAIN AN ACCEPTABLE ADMIXTURE TO PRODUCE AIR-ENTRAINED CONCRETE WITH TOTAL AIR CONTENT... 3. MIX DESIGNS LISTED BELOW SHALL BE SUBMITTED TO THE ARCHITECT AND APPROVED PRIOR TO USE... 4. MAXIMUM SIZE OF AGGREGATE SHALL BE AS LISTED BELOW... 5. THE CONTRACTOR SHALL DETERMINE SLUMP... 6. THE USE OF SUPER PLASTICIZERS AND WATER REDUCERS IS ALLOWED...

CONCRETE MIX DESIGN TABLE

Table with columns: LOCATION, TEST AGE (DAYS), TEST W/C RATIO, AIR CONTENT (%), MAX. AGGREGATE SIZE. Rows include MISCELLANEOUS CONCRETE, EXTERIOR SLABS ON GRADE, EXTERIOR CONCRETE ON STEEL DECK, INTERIOR SLABS ON GRADE, WALLS AND FOOTINGS.

FIBER REINFORCED CONCRETE

- 1. FIBER REINFORCED CONCRETE MAY BE USED FOR INTERIOR SLABS ON GRADE... 2. EITHER POLYPROPYLENE OR NYLON FIBERS MAY BE USED... 3. FIBER REINFORCED CONCRETE OF THE SAME THICKNESS MAY BE USED IN LIEU OF REINFORCED SLABS ON GRADE...

REINFORCING STEEL

- 1. ALL REINFORCING SHALL BE NEW BILLET STOCK ASTM A615, GRADE 60... 2. NO REINFORCING BARS SHALL BE SPLICED BY WELDING... 3. WELDING OR TACK WELDING OF REINFORCING BARS TO OTHER BARS OR TO PLATES, ANGLES, ETC. IS PROHIBITED... 4. MINIMUM CAST-IN-PLACE CONCRETE COVER OVER REINFORCING STEEL... A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH... B. CONCRETE EXPOSED TO EARTH OR WEATHER... C. OTHER CONCRETE: WALLS - INTERIOR FACE: #14 AND #18 BARS: 1 1/2 INCHES, #11 BARS AND SMALLER: 3/4 INCH.

CONSTRUCTION JOINTS

- 1. ALL CONSTRUCTION JOINTS IN WALLS SHALL BE KEYPED IN ACCORDANCE WITH THE TYPICAL DETAILS... 2. VERTICAL CONSTRUCTION JOINTS AND CONTROL JOINTS IN CONCRETE AND CMU WALLS SHALL BE HELD TO A MAXIMUM SPACING OF 30'-0"... 3. ALL CONSTRUCTION JOINTS IN SLABS, JOISTS, BEAMS, AND GIRDERS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW... 4. ALL CONSTRUCTION JOINTS FOR SLABS ON DECK SHALL BE IN ACCORDANCE WITH THE TYPICAL SLAB ON DECK CONSTRUCTION... 5. ALL CONSTRUCTION, CONTROL, AND ISOLATION JOINTS FOR SLABS ON GRADE SHALL BE IN ACCORDANCE WITH THE TYPICAL SLAB ON GRADE DETAILS... 6. THE CONTRACTOR SHALL SUBMIT THE PROPOSED LOCATIONS OF CONSTRUCTION JOINTS TO THE ENGINEER FOR ACCEPTANCE BEFORE STARTING CONSTRUCTION.

ANCHORAGE TO HARDENED CONCRETE

- 1. ANCHORAGE TO HARDENED CONCRETE SHALL INCLUDE MECHANICAL AND ADHESIVE ANCHORS OF SIZE, NUMBER, AND SPACING AS SHOWN ON THE DRAWINGS... 2. HOLES SHALL BE DRILLED AND CLEANED AND ANCHORS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTRUCTIONS... 3. INSPECTION AND TESTING SHALL BE PROVIDED IN ACCORDANCE WITH THE GENERAL NOTES AND THE APPROVED ID-D-ES REPORT... 4. WHERE A SPECIFIC TYPE OF ANCHORAGE IS SPECIFIED ON THE DRAWINGS, SUBSTITUTION FOR A DIFFERENT TYPE OF ANCHORAGE (INCLUDING SUBSTITUTING FOR CAST-IN-PLACE ANCHORAGE) SHALL NOT BE PERMITTED WITHOUT PRIOR WRITTEN APPROVAL.

MECHANICAL ANCHORS

- 1. ACCEPTABLE MECHANICAL ANCHORS SHALL BE AS FOLLOWS: HILTI "KWIK BOLT T2" CARBON AND STAINLESS STEEL EXPANSION ANCHOR (ICC-ES ESR-1917), SIMPSON STRONG-TIE "STRONG-BOLT" WEDGE ANCHOR (ICC-ES ESR-1771), OR APPROVED ALTERNATIVE WITH A CURRENT ICC-ES REPORT INDICATING THAT THE ANCHOR IS PERMITTED FOR RESISTING THE APPLIED LOADS IN CRACKED CONCRETE... 2. UNLESS NOTED OTHERWISE ON THE DRAWINGS, MINIMUM EFFECTIVE ANCHOR EMBEDMENT DEPTH SHALL BE 8.5 ANCHOR DIAMETERS... 3. STAINLESS STEEL ANCHORS SHALL BE USED AT ALL EXTERIOR LOCATIONS AND WHERE SPECIFICALLY INDICATED ON THE DRAWINGS... 4. DEFECTIVE OR ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT OR AN INJECTABLE ADHESIVE MATCHING THE ADJACENT CONCRETE COMPRESSIVE STRENGTH... 5. DEFECTIVE OR ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT OR AN INJECTABLE ADHESIVE MATCHING THE ADJACENT CONCRETE COMPRESSIVE STRENGTH... 6. DEFECTIVE OR ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT OR AN INJECTABLE ADHESIVE MATCHING THE ADJACENT CONCRETE COMPRESSIVE STRENGTH...

ADHESIVE ANCHORS

- 1. ACCEPTABLE ADHESIVE (EPOXY) ANCHORS SHALL BE AS FOLLOWS: A. INSTALLED IN CONCRETE: - HILTI "HIT-HY 200" (ICC-ES ESR-3187) - SIMPSON STRONG-TIE "SET-XP" (ICC-ES ESR-2508) - APPROVED ALTERNATE WITH A CURRENT ICC-ES REPORT... B. INSTALLED IN CONCRETE MASONRY: - HILTI "HIT-HY 70" (ICC-ES ESR-2882) - SIMPSON STRONG-TIE "SET" (ICC-ES ESR-1772) - APPROVED ALTERNATE WITH A CURRENT ICC-ES REPORT... C. INSTALLED IN BRICK MASONRY: - HILTI "HIT-HY 70" (ICC-ES ESR-3342) - SIMPSON STRONG-TIE "SET" (ICC-ES ESR-1772) - APPROVED ALTERNATE WITH A CURRENT ICC-ES REPORT...

- 2. UNLESS NOTED OTHERWISE, ANCHORS SHALL BE ASTM A36 THREADED ROD OR ASTM A615, GRADE 60 REINFORCING STEEL DOWELS... 3. UNLESS NOTED OTHERWISE ON THE DRAWINGS, MINIMUM EFFECTIVE ANCHOR EMBEDMENT DEPTH SHALL BE 6.5 ANCHOR DIAMETERS, AND MINIMUM ANCHOR SPACING SHALL BE 6 ANCHOR DIAMETERS...

- 4. HOLES SHALL BE DRILLED WITH ROTARY IMPACT HAMMER OR EQUIVALENT METHOD TO PRODUCE A HOLE WITH A ROUGH INSIDE SURFACE. CORE DRILLING HOLES IS NOT PERMITTED... 5. NO REINFORCING SHALL BE CUT TO INSTALL ADHESIVE ANCHORS...

- 6. TWO-PART ADHESIVES SHALL BE MIXED, APPLIED, AND CURED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS IN THE ICC-ES REPORT. ALL PLACEMENT AND CURING SHALL BE CONDUCTED WITH CONCRETE AND AIR TEMPERATURES ABOVE 50 DEGREES FAHRENHEIT. ADHESIVE SHALL BE APPLIED ONLY TO CLEAN, DRY CONCRETE. POSITIVE PROTECTION SHALL BE PROVIDED SO THAT ANCHORS ARE NOT DISTURBED DURING THE CURING PERIOD...

- 7. DEFECTIVE OR ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT OR AN INJECTABLE ADHESIVE MATCHING THE ADJACENT CONCRETE COMPRESSIVE STRENGTH. NOTIFY THE STRUCTURAL ENGINEER OF DEFECTIVE OR ABANDONED HOLES IN WALLS AND COLUMNS. THESE ELEMENTS MAY REQUIRE NON-SHRINK GROUT WITH A COMPRESSIVE MODULUS OF ELASTICITY MATCHING THAT OF THE ADJACENT CONCRETE.

STRUCTURAL STEEL

- ALL STEEL SHALL CONFORM TO THE FOLLOWING: ALL ANGLES, CHANNELS & PLATES ASTM A36, Fy=36 KSI UNLESS NOTED OTHERWISE. SQUARE OR RECTANGULAR STRUCTURAL TUBE (HSS) ASTM A500, GRADE B, Fy=46 KSI... 1. GENERAL NOTES FOR STEEL CONNECTIONS SHALL APPLY TO ALL STEEL CONNECTIONS UNLESS NOTED OTHERWISE... 2. ALL WORK SHALL BE IN ACCORDANCE WITH THE AISC SPECIFICATION... 3. ALL STEEL ANCHORS AND TIES AND OTHER MEMBERS EMBEDDED IN CONCRETE OR MASONRY SHALL BE LEFT UNPAINTED... 4. MINIMUM CONNECTIONS SHALL BE A TWO-BOLT CONNECTION USING 3/4 INCH DIAMETER A325 BOLTS IN SINGLE SHEAR... 5. ALL CONSTRUCTION, CONTROL, AND ISOLATION JOINTS FOR SLABS ON GRADE SHALL BE IN ACCORDANCE WITH THE TYPICAL SLAB ON GRADE DETAILS... 6. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ALL ERECTION AIDS THAT INCLUDE, BUT ARE NOT LIMITED TO, ERECTION ANGLES, LIFT HOLES, AND OTHER AIDS.

ANCHOR RODS

- 1. ANCHOR RODS SHALL BE ASTM F1554 GRADE 36 WITH CLASS 1A THREADS, UNLESS NOTED OTHERWISE... 2. ANCHOR RODS MAY BE HEADED BOLT OR UNHEADED ROD MATERIAL... 3. FURNISH HARDENED PLATE WASHERS, LOCK WASHERS, AND MATCHING HEAVY HEX NUTS FOR SECURING THE BASE PLATE TO THE ANCHOR RODS... 4. HOOKED ANCHOR RODS SHALL NOT BE USED EXCEPT WHERE NOTED... 5. A RIGID STEEL TEMPLATE SHALL BE USED TO LOCATE ANCHOR RODS WHILE PLACING CONCRETE... 6. ANCHOR RODS SHALL HAVE SUFFICIENT LENGTH TO PROVIDE THE MINIMUM EMBEDMENT SHOWN ON THE DRAWINGS... 7. ANCHOR ROD INSTALLATION SHALL BE COORDINATED WITH REINFORCING AND FORMWORK... 8. LEVELING NUTS SHALL NOT BE USED EXCEPT AFTER EVALUATION BY THE CONTRACTOR'S ERECTION ENGINEER... 9. AFTER BASE INSTALLATION, ANCHOR ROD NUTS SHALL BE INSTALLED TO A SNUG-TIGHT CONDITION... 10. NO HEATING OR BENDING OF THE ANCHOR RODS IS PERMITTED... 11. HOLES IN THE BASE MATERIAL SHALL NOT BE ENLARGED BY BURNING.

WOOD FRAMING LUMBER

- 1. FRAMING LUMBER SHALL BE KILN DRIED OR MC-15, AND GRADED AND MARKED IN CONFORMANCE WITH WEST COAST LUMBER INSPECTION BUREAU STANDARD GRADING RULES FOR WEST COAST LUMBER NO. 16, LATEST EDITION... 2x JOISTS AND BUILT-UP MEMBERS DOUGLAS FIR-LARCH NO. 2 OR SOUTHERN PINE NO. 2... 3x AND 4x BEAMS AND POSTS DOUGLAS FIR-LARCH NO. 2... 6x AND LARGER BEAMS AND STRINGERS DOUGLAS FIR-LARCH NO. 1... 6x AND LARGER POSTS AND TIMBERS DOUGLAS FIR-LARCH NO. 1... STUDS, PLATES AND MISCELLANEOUS LIGHT FRAMING SPRUCE-PINE-FIR NO. 2 OR BETTER... TOP AND BOTTOM PLATES AT BEARING WALLS DOUGLAS FIR-LARCH CONSTRUCTION GRADE... BOLTED STUDS, LEDGERS AND PLATES DOUGLAS FIR-LARCH STANDARD GRADE

LAMINATED VENEER LUMBER (LVL)

- 1. LAMINATED VENEER LUMBER (LVL) SHALL BE MANUFACTURED UNDER A PROCESS APPROVED BY THE NATIONAL RESEARCH BOARD... 2. ALL LAMINATED VENEER LUMBER SHALL BE MANUFACTURED IN ACCORDANCE WITH ICC-ES REPORT ESR-1387... 3. ALL MEMBERS SHALL BE WESTERN SPECIES, GRADE 1.8E, Fb = 2,600 PSI, Fv = 285 PSI... 4. DESIGN SHOWN ON PLANS IS BASED ON LVL MEMBERS MANUFACTURED BY TRUS JOIST, A WEYERHAEUSER BUSINESS... 5. ALTERNATE JOIST HANGERS AND OTHER HARDWARE MAY BE SUBSTITUTED FOR ITEMS SHOWN PROVIDED THEY HAVE THE CURRENT ICC-ES EVALUATION REPORTS DEMONSTRATING THAT THE PRODUCTS HAVE EQUAL OR GREATER LOAD CAPACITIES...

TIMBERSTRAND RIM BOARD (LSL)

- 1. TIMBERSTRAND RIM BOARD (LSL) SHALL BE MANUFACTURED UNDER A PROCESS APPROVED BY THE NATIONAL RESEARCH BOARD... 2. ALL TIMBERSTRAND RIM BOARD SHALL BE MANUFACTURED IN ACCORDANCE WITH ICC-ES REPORT ESR-1387... 3. ALL MEMBERS SHALL BE GRADE 1.3E, Fb = 1,700 PSI, Fv = 150 PSI... 4. DESIGN SHOWN ON PLANS IS BASED ON LSL MEMBERS MANUFACTURED BY TRUS JOIST, A WEYERHAEUSER BUSINESS...

PREFABRICATED CONNECTOR PLATE WOOD ROOF TRUSSES

- 1. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF CONNECTION DETAILS AND REQUIRED CONNECTION MATERIALS... 2. ROOF TRUSSES SUPPORTING SNOW LOADS SHALL BE DESIGNED TO RESIST THE SNOW LOADS SET FORTH IN ACSE 7, CHAPTER 7... 3. ROOF TRUSS DEFLECTION SHALL MEET THE MINIMUM IBC REQUIREMENTS UNLESS A MORE STRINGENT CRITERIA IS NOTED ON THE PLANS... 4. WOOD TRUSSES SHALL UTILIZE APPROVED CONNECTOR PLATES (GANGNAIL OR APPROVED EQUAL)... 5. SUBMIT SHOP DRAWINGS AND DESIGN CALCULATIONS COMPLETE WITH STRESS DIAGRAMS FOR REVIEW A MINIMUM OF TWO WEEKS PRIOR TO FABRICATION... 6. PROVIDE FOR ALL TRUSS-TO-TRUSS AND TRUSS-TO-GIRDER TRUSS CONNECTION DETAILS AND REQUIRED CONNECTION MATERIALS...

PLYWOOD

- 1. PLYWOOD SHEATHING SHALL BE GRADE C-D EXTERIOR GLUE OR STRUCTURAL II, EXTERIOR GLUE SHALL BE IN ACCORDANCE WITH THE BUILDING CODE, UNITED STATES VOLUNTARY PRODUCT STANDARDS PS-1 AND PS-2... 2. ORIENTED STRAND BOARD OF EQUIVALENT THICKNESS, EXPOSURE RATING, AND PANEL INDEX MAY BE USED IN LIEU OF PLYWOOD.

ROOF SHEATHING

- 1. PROVIDE 5/8-INCH CDX PLYWOOD, INDEX 32/16, UNLOCKED, LAID UP WITH FACE GRAIN PERPENDICULAR TO FRAMING BELOW... 8d AT 6 INCHES ON CENTER DIAPHRAGM BOUNDARIES AND OVER EXTERIOR WALLS AND SHEAR WALLS... 8d AT 12 INCHES ON CENTER FIELD NAILING

FLOOR SHEATHING

- 1. PROVIDE 3/4-INCH TONGUE AND GROOVE CDX PLYWOOD, INDEX 40/20, UNLOCKED, LAID UP WITH FACE GRAIN PERPENDICULAR TO FRAMING BELOW... 10d AT 6 INCHES ON CENTER DIAPHRAGM BOUNDARIES AND OVER EXTERIOR WALLS AND SHEAR WALLS... 10d AT 10 INCHES ON CENTER FIELD NAILING

TREATED WOOD

- 1. ALL WOOD PLATES, LEDGERS AND BLOCKING IN DIRECT CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESSURE-TREATED WITH AN AMERICAN WOOD PRESERVERS ASSOCIATION (AWPA) APPROVED PRESERVATIVE... 2. ALL METAL FASTENERS IN CONTACT WITH TREATED WOOD SHALL BE GALVANIZED OR STAINLESS STEEL...

TIMBER CONNECTORS

- 1. TIMBER CONNECTORS CALLED OUT BY LETTERS AND NUMBERS SHALL BE BY SIMPSON STRONG-TIE COMPANY, INC. AS SPECIFIED IN THE LATEST EDITION OF THEIR CATALOG... 2. CONNECTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS... 3. ALL BOLTS IN WOOD MEMBERS SHALL CONFORM TO ASTM A307... 4. ALL NAILS SHALL BE COMMON, UNLESS NOTED OTHERWISE... 5. ALL SHIMS SHALL BE SEASONED AND DRIED AND THE SAME GRADE (MINIMUM) AS MEMBERS CONNECTED... 6. ALL SINGLE JOISTS, DOUBLE JOISTS AND TRIPLE JOISTS SHALL BE CONNECTED TO FLUSH BEAMS WITH "U" SERIES JOIST HANGERS, UNLESS NOTED OTHERWISE.

STRUCTURAL ABBREVIATION LIST:

Table with columns: ABBREVIATION, DESCRIPTION. Includes entries for ADDL, AHU, ANCH, ANGLE, APPROX, ARCH, AT, BW, BLK, B.O., BRG, BM, BOT, C.J., CL or CL, CLR, CONC, CONN, CONT, CU, YD, DIA, DTL, DWG, DWLS, EA, E, F, ELEV, E.W., EXT, EXT, Fc, FND, FT, FTG, FLD, FY, GA, GALV, GL, HSA, I, INFO, INSUL, INT, JST, K OR KIP, KSI, LB, LB, LOC, LONG, W, MANUF, MAX, M.C, MECH, MIN, MPH, MTL, NUMBER, No., O.C, OPNG, OPP, P.D.F, PL, PLF, PLYWD, PROJ, PSF, PSI, RADIUS, REINF, REINFD, RW, SIM, SQ, STL, STRUCT, SW, THK, T.O, TRTD, TYP, U.N.O, VERT, VYF, VSC, WIDTH, WNDW, W, WWF.

SHEET INDEX

Table with columns: SHT. NO., DESCRIPTION. Lists sheets S0.1 through S0.4 with descriptions like STRUCTURAL NOTES / ABBREVIATIONS / SHEET INDEX, TYPICAL CONCRETE SECTIONS / DETAILS, FOUNDATION PLAN / SECTIONS / DETAILS, SECOND FLOOR FRAMING PLAN / SECTIONS / DETAILS, ROOF FRAMING PLAN / SECTIONS / DETAILS, SECTIONS / DETAILS.



SAFE HAVEN WOMEN'S SHELTER

DULUTH, MN 55812

project #: 21-368, date: 09/24/2021, drawn by: CAJ / HMM, checked by: MRU

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

signature: Mark R. Udd

printed name: MARK R. UDD

reg. #: 40443

sign date: 09/24/2021

Table with columns: revision / issue, no., date. Includes a SHEET INDEX / ABBREVIATIONS / STRUCTURAL NOTES section at the bottom with sheet number S0.1.





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# SAFE HAVEN WOMEN'S SHELTER

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

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printed name: MARK R. UDD

reg. #: 40443

sign date: 09/24/2021

revision / issue no. date

STRUCTURAL  
NOTES

sheet number: S0.2

### WOOD FRAMING DETAILS

- THE FOLLOWING APPLY UNLESS OTHERWISE SHOWN ON THE PLANS.
- AT JOIST AREAS: PROVIDE CROSS-BRIDGING AT 8'-0" ON CENTER MAXIMUM. PROVIDE SOLID BLOCKING OR CONTINUOUS RIM AT ALL BEARING POINTS. PROVIDE SOLID BLOCKING UNDER ALL BEARING WALLS ABOVE.
  - PROVIDE DOUBLE JOIST UNDER ALL PARALLEL PARTITIONS THAT EXTEND OVER MORE THAN HALF THE JOIST LENGTH. PROVIDE DOUBLE JOISTS EACH SIDE OF ALL OPENINGS IN FLOORS AND ROOFS UNLESS DETAILED OTHERWISE. COORDINATE SIZE AND LOCATION OF ALL OPENINGS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
  - PROVIDE TWO 2x10 HEADERS OVER AND DOUBLE STUDS EACH SIDE OF ALL OPENINGS IN STUD BEARING WALLS UNLESS NOTED OTHERWISE.
  - PROVIDE SOLID BLOCKING AT FLOORS FOR WOOD COLUMNS AND MULTIPLE STUD POSTS TO PASS THROUGH.
  - PROVIDE CONTINUOUS SOLID BLOCKING AT MID-HEIGHT OF ALL STUD WALLS OVER 10'-0" IN HEIGHT.
  - ALL STUD WALLS UNLESS NOTED OTHERWISE SHALL BE 2x4 AT 16 INCHES ON CENTER AT INTERIOR WALLS AND 2x6 AT 16 INCHES ON CENTER AT EXTERIOR WALLS.
  - USE FULL-LENGTH STUDS (BALL OON FRAME) ON EXTERIOR WALLS AT STAIRWAYS AND AT VAULTED CEILING.
  - PLYWOOD WALL SHEATHING SHALL HAVE SOLID BLOCKING AT ALL EDGES. PROVIDE THE FOLLOWING MINIMUM NAILING UNLESS NOTED OTHERWISE ON PLANS:
    - 8d AT 6 INCHES ON CENTER AT SHEET EDGES
    - 8d AT 12 INCHES ON CENTER AT INTERMEDIATE BEARING POINTS
  - ALL WOOD STUD WALLS SHALL HAVE LOWER WOOD PLATE ATTACHED TO WOOD FRAMING BELOW WITH 16d NAILS AT 6 INCHES ON CENTER STAGGERED OR BOLTED TO CONCRETE WITH 5/8-INCH-DIAMETER ANCHOR BOLTS AT 6'-0" ON CENTER UNLESS NOTED OTHERWISE ON THE PLANS. ALL ANCHOR BOLTS SHALL HAVE 2x2x3/16-INCH PLATE WASHERS AND A MINIMUM EMBEDMENT OF 7 INCHES IN CONCRETE.

### FOUNDATIONS

- EXISTING DOWELS SHALL BE INSTALLED WITH A TEMPLATE TO HOLD BARS IN THE PROPER POSITION AND SHALL BE PLACED WITH A TOLERANCE OF +/- 1/4 INCH.
- SPREAD FOOTINGS:
  - DESIGN SOIL BEARING PRESSURE = 4,000 PSF.
  - ALL FOOTINGS SHALL BEAR ON EXISTING BEDROCK SURFACE OR CLEAN COMPACTED ENGINEERED BACKFILL AS PER THE GEOTECHNICAL REPORT AND SHALL BE LOWERED TO FIRM BEARING IF SUITABLE SOIL IS NOT FOUND AT ELEVATIONS DETERMINED BY TOP OF FOOTING ELEVATION AND FOOTING DEPTH.
- REFER TO THE PROJECT GEOTECHNICAL EVALUATION REPORT FOR SOIL CONDITIONS AND RECOMMENDATIONS
  - PREPARED BY: EPC ENGINEERING & TESTING
  - PROJECT NO.: 21G1524
  - DATED: JULY 16, 2021
- SITE AND BUILDING SUBGRADE SHALL BE PREPARED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE PROJECT GEOTECHNICAL REPORT.

### STRUCTURAL FILL

- ALL FILL PLACED TO SUPPORT SLABS ON GRADE, BEHIND PERMANENT WALLS, AND AROUND ALL DRAINS SHALL CONSIST OF WELL GRADED, GRANULAR MATERIAL PER THE SPECIFICATIONS.
- SOILS FOR STRUCTURAL FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER.
- STRUCTURAL FILL SHALL BE PLACED ON SOUND NATIVE MATERIAL.
- PROOF-ROLL CUT AREAS WHICH PROVIDE SUPPORT FOR PERMANENT STRUCTURES.
- AREAS WHICH ARE EXCESSIVELY YIELDING, AS DETERMINED BY THE CONTINUOUS OBSERVATION OF THE GEOTECHNICAL ENGINEER, SHALL BE OVEREXCAVATED AND REPLACED WITH STRUCTURAL FILL.
- STRUCTURAL FILL SHALL BE PLACED PER THE SPECIFICATION.

### LATERAL PRESSURE ON SUBGRADE WALLS

- THE DESIGN PRESSURES FOR SUBGRADE WALLS ARE BASED ON A "DRAINED" CONDITION. SEE CIVIL AND MECHANICAL DRAWINGS FOR SUBGRADE DRAINAGE SYSTEM.
- SEE GEOTECHNICAL REPORT FOR COMPACTION REQUIREMENTS AT SUBGRADE WALLS.
- SUBGRADE WALLS AND SUPPORTING SLABS SHALL HAVE ATTAINED THEIR FULL CONCRETE STRENGTH BEFORE PLACING ANY BACKFILL. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACES FOR WALLS IF BACKFILL IS PLACED BEFORE WALLS AND SLABS ACHIEVE FULL CONCRETE STRENGTH.
- BACKFILLED, RESTRAINED BASEMENT WALLS ARE DESIGNED USING AN EQUIVALENT AT-REST LATERAL EARTH PRESSURE = 55 PCF PER THE GEOTECHNICAL REPORT.
- BACKFILLED, UNRESTRAINED RETAINING WALLS ARE DESIGNED USING AN EQUIVALENT ACTIVE LATERAL EARTH PRESSURE = 35 PCF PER THE GEOTECHNICAL REPORT.

### STAIRS, ELEVATORS, AND MISCELLANEOUS METALS

- UNLESS SHOWN AND DETAILED IN THE STRUCTURAL DRAWINGS, ALL STAIRS ARE TO CONSIST OF A PRE-FABRICATED AND PRE-ENGINEERED STAIR, LANDING, AND RAILING SYSTEM DESIGNED BY THE CONTRACTOR OR STAIR SUPPLIER. SEE THE ARCHITECT FOR STAIR SYSTEM LAYOUT, DIMENSIONS, AND CONFIGURATION OF RISE AND RUN. THE CONTRACTOR SHALL BE RESPONSIBLE TO DESIGN AND PROVIDE THE STAIR SYSTEM INCLUDING ALL CONNECTIONS AND SECONDARY SUPPORT FRAMING.
- ALL ELEVATOR MACHINE BEAMS, HOIST BEAMS, SILLS, DOOR SUPPORTS, AND RAILS AND THEIR CONNECTIONS TO THE PRIMARY STRUCTURE ARE TO BE DESIGNED BY THE ELEVATOR MANUFACTURER. THE CONTRACTOR SHALL PROVIDE ADDITIONAL FRAMING AS NECESSARY FOR ADDITIONAL MACHINE ROOM FLOOR PENETRATIONS PER THE TYPICAL DETAILS. THE ELEVATOR MACHINE BEAMS SHALL BE DESIGNED TO BE FLUSH WITH THE BOTTOM OF CONCRETE AND SHALL BE DESIGNED FOR THE TRIBUTARY LOADS INDICATED IN THE LOAD MAPS IN ADDITION TO THE WEIGHT OF THE SUPPORTED EQUIPMENT AND SELF WEIGHT OF THE MACHINE ROOM FLOOR/ROOF STRUCTURE.
- THE CONTRACTOR SHALL DESIGN AND SUPPLY ALL ADDITIONAL MISCELLANEOUS METALS THAT ARE INDICATED IN THE ARCHITECTURAL DRAWINGS OR THOSE METALS WHICH ARE FOUND TO BE NECESSARY TO SUPPORT THE ARCHITECTURAL FINISHES OR OTHER BUILDING SYSTEMS.
- ALL FRAMING AND CONNECTIONS DESIGNED BY THE CONTRACTOR SHALL NOT RESULT IN ECCENTRIC LOADS BEING APPLIED TO THE PRIMARY STRUCTURE NOR LATERAL LOADS BEING APPLIED TO THE BOTTOM FLANGE OF STEEL BEAMS. THE CONTRACTOR'S DESIGN SHALL VERIFY THAT THE CONNECTIONS DO NOT RESULT IN ADVERSE LOCAL CONNECTION STRESSES OCCURRING WITHIN THE PRIMARY STRUCTURE. SUBMIT CALCULATIONS STAMPED BY A STRUCTURAL ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED AND SHOP DRAWINGS INDICATING IMPOSED LOADS ON THE PRIMARY STRUCTURE.

### SECONDARY SUPPORT FRAMING

- SECONDARY SUPPORT FRAMING FOR CONNECTING NON-STRUCTURAL COMPONENTS TO THE PRIMARY STRUCTURE SHALL BE DESIGNED, SUPPLIED AND INSTALLED BY OTHERS.
- SHOP DRAWINGS FOR SECONDARY SUPPORT FRAMING SHALL BE SUBMITTED FOR REVIEW ALONG WITH THE SUPPORTING CERTIFIED STRUCTURAL CALCULATIONS. SUBMITTAL SHALL IDENTIFY THE LOADS IMPOSED UPON THE PRIMARY STRUCTURE AT THE CONNECTION POINTS OF THE SECONDARY SUPPORT FRAMING.
- UNISTRUT, OR EQUIVALENT, AND ITS CONNECTIONS SHALL BE CONSIDERED SECONDARY SUPPORT FRAMING, UNLESS SPECIFICALLY NOTED OTHERWISE.

### BUILDING TOLERANCES

- STANDARD TOLERANCES SHALL BE BASED ON THE REQUIREMENTS OF THE AISC CODE OF STANDARD PRACTICE AND ACI 117, "STANDARD SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS."

### SEQUENCING CONSTRUCTION AND LATERAL STABILITY

- THE STRUCTURAL COMPONENTS BY THEMSELVES ARE A NON-SELF-SUPPORTING STRUCTURE. LATERAL FORCES DUE TO WIND, EARTHQUAKE, OR SOIL ARE CARRIED BY THE ROOF AND FLOOR DIAPHRAGMS TO THE LATERAL SYSTEM. CERTAIN ELEMENTS SHOWN ON THE STRUCTURAL DRAWINGS (SUCH AS BRACING, ROOF AND FLOOR SLABS, AND CONCRETE IN COMPOSITE COLUMNS) ARE REQUIRED FOR OVERALL OR LOCAL STABILITY OF OTHER ELEMENTS (SUCH AS BEAMS, COLUMNS, AND WALLS).
- IF, DUE TO SEQUENCING OF CONSTRUCTION, THESE STABILITY ELEMENTS ARE NOT IN PLACE, THE CONTRACTOR SHALL RETAIN A STRUCTURAL ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED, WHO SHALL INVESTIGATE WHERE TEMPORARY SHORING/BRACING IS REQUIRED, AND SHALL DESIGN THIS TEMPORARY SHORING/BRACING. THE CONTRACTOR SHALL PROVIDE THIS SHORING/BRACING UNTIL THE REQUIRED STRUCTURAL ELEMENTS AND THEIR CONNECTIONS HAVE BEEN INSTALLED AND REACH THEIR FINAL DESIGN STRENGTHS.

### EXISTING STRUCTURE

- EXISTING STRUCTURAL DIMENSIONS AND MEMBER SIZES ARE FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD PRIOR TO FABRICATION. THE CONTRACTOR SHALL VERIFY THE ACTUAL CONFIGURATION OF EXISTING CONSTRUCTION AND THE CONDITION OF THE STRUCTURE BEFORE BEGINNING WORK.
- ANY DISCREPANCIES OF UNSOUND CONDITIONS SHALL BE REPORTED TO THE ARCHITECT FOR RESOLUTION BEFORE BEGINNING WORK.
- REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS, EMBEDMENTS, AND OPENINGS NOT SHOWN.
- REFER TO MECHANICAL AND ELECTRICAL PLANS FOR DUCTS, PIPING, EMBEDMENTS, AND OPENINGS NOT SHOWN.
- TEMPORARY SHORING AND BRACING MAY BE NECESSARY IN ORDER TO PERFORM THE NECESSARY STRUCTURAL MODIFICATIONS TO THE EXISTING STRUCTURE SHOWN ON THE STRUCTURAL AND ARCHITECTURAL PLANS AND DETAILS. THE CONTRACTOR MUST RETAIN A STRUCTURAL ENGINEER LICENSED TO PERFORM THE WORK IN THE JURISDICTION WHERE THE PROJECT IS LOCATED, WHO SHALL INVESTIGATE WHERE THIS TEMPORARY SHORING/BRACING IS REQUIRED AND SHALL DESIGN THIS TEMPORARY SHORING/BRACING.

### DEFERRED STRUCTURAL SUBMITTALS

- SOME STRUCTURAL SYSTEMS ARE DEFINED AS VENDOR-DESIGNED COMPONENTS PER THE STRUCTURAL DOCUMENTS. THESE ELEMENTS OF THE DESIGN ARE DEFERRED SUBMITTAL COMPONENTS AND HAVE NOT BEEN PERMITTED UNDER THE BASE BUILDING APPLICATION. THE CONTRACTOR WILL BE REQUIRED TO SUBMIT THE STAMPED COMPONENT SYSTEM DOCUMENTS TO THE BUILDING OFFICIAL FOR APPROVAL.
- DOCUMENTS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED TO THE ARCHITECT, WHO SHALL REVIEW THEM FOR GENERAL CONFORMANCE TO THE DESIGN OF THE BUILDING. THE CONTRACTOR SHALL SUBMIT THESE REVIEWED DEFERRED SUBMITTAL DOCUMENTS TO THE BUILDING OFFICIAL. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THE DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL.
- THE FOLLOWING LIST INCLUDES THE ITEMS THAT ARE DEFINED AS DEFERRED STRUCTURAL SUBMITTAL COMPONENTS. REFER TO THE ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND CIVIL DRAWINGS FOR ADDITIONAL DEFERRED SUBMITTAL COMPONENTS.
- DEFERRED STRUCTURAL SUBMITTAL COMPONENTS:
  - WOOD ROOF TRUSSES

### MISCELLANEOUS

- REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, CIVIL, ELEVATOR, OR OTHER SPECIALTY ENGINEERING DRAWINGS FOR DIMENSIONS NOT SHOWN, INCLUDING BUT NOT LIMITED TO: SIZE AND LOCATION OF CURBS; EQUIPMENT HOUSKEEPING PADS; WALL AND FLOOR OPENINGS, BLOCKOUTS, FLOOR DEPRESSIONS, SUMPS, DRAINS, ANCHOR BOLTS, EMBEDDED ITEMS, ARCHITECTURAL TREATMENT, ETC. THE CONTRACTOR SHALL VERIFY DIMENSIONS AND RESOLVE DISCREPANCIES OR CONFLICTS PRIOR TO CONSTRUCTION.
- WHERE SECTIONS ARE INDICATED ON THE PLAN BY A NUMBER AND A DRAWING NUMBER THUS, 1SS 01, THE INDICATED SECTION (1) IS SHOWN ON STRUCTURAL DRAWING 55.01.

### SPECIAL INSPECTION

- THE FOLLOWING ITEMS REQUIRE SPECIAL INSPECTION AND TESTING PER IBC SECTION 1704.
- THIS WORK SHALL BE PERFORMED BY A SPECIAL INSPECTOR CERTIFIED BY THE GOVERNING BUILDING OFFICIAL TO PERFORM THE TYPES OF INSPECTIONS AND TESTS SPECIFIED.
- THE FREQUENCY OF INSPECTIONS AND TESTING SHALL BE AS OUTLINED IN THE IBC TABLE ITEMS LISTED BELOW.
- DEFICIENCIES SHALL BE REPORTED DAILY TO THE CONTRACTOR.
- SUMMARY REPORTS SHALL BE DISTRIBUTED WEEKLY TO THE OWNER, ARCHITECT, CONTRACTOR, BUILDING OFFICIAL, AND STRUCTURAL ENGINEER. THE CONCRETE SUPPLIER SHALL BE INCLUDED IN THE DISTRIBUTION OF ALL SUMMARY REPORTS FOR CONCRETE TESTING.
- SEE THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR SPECIAL INSPECTION AND TESTING.

SPECIAL INSPECTION TABLE		
ITEM	DESCRIPTION (SEE IBC SECTS. 1704 & 1705)	IBC REQUIREMENT
CONCRETE	CONCRETE THAT IS PART OF THE STRUCTURE	TABLE 1705.3 ITEMS 5, 6, 7, 8, 10, AND 12
BOLTS INSTALLED IN CONCRETE	ANCHOR BOLTS, HEADED STUDS (EXCEPT AT BEAM-TO-DECK INSTALLATION)	TABLE 1705.3 ITEM 3
REINFORCING STEEL	A. PLACEMENT OF REINFORCING STEEL B. SPLICING OF REINFORCING STEEL BY BUTT WELDING, EXOTHERMIC WELDING PROCESS OR THREADED COUPLERS	TABLE 1705.3 ITEM 1 TABLE 1705.3 ITEM 2
STRUCTURAL STEEL	A. STRUCTURAL STEEL THAT IS PART OF THE STRUCTURE B. WELDING, HIGH STRENGTH BOLTING, AND DETAILS C. FIELD CUT SURFACES D. FIELD HEATING FOR STRAIGHTENING E. TOLERANCES FOR FIELD ERECTION	IBC SECTION 1705.2, AISC 360 CHAPTER N AISC 360 SECTION N5 AISC 360 SECTION M2.2 AISC 360 SECTION M2.1 CODE OF STANDARD PRACTICE SECTION 7.13
STRUCTURAL WOOD	A. PRE-FABRICATED STRUCTURAL ELEMENTS B. HIGH-LOAD ROOF AND FLOOR DIAPHRAGMS (2 OR 3 LINES OF FASTENERS) C. FASTENING COMPONENTS TO WIND FORCE RESISTING WOOD CONSTRUCTION INCLUDING SHEAR WALLS, BRACES, DIAPHRAGMS, DRAG STRUTS, AND HOLDOWNS	SECTION 1705.5 AND 1705.5.2 SECTION 1705.5.1 SECTION 1705.11.1
SOILS, SPECIAL GRADING, EXCAVATION AND FILLING	A. FOUNDATION EXCAVATIONS AND BEARING STRATA B. TESTING, PREPARATION, PLACEMENT, AND COMPACTION	TABLE 1705.6 ITEMS 1 AND 2 TABLE 1705.6 ITEMS 3, 4, AND 5
POST INSTALLED ANCHORS OR DOWELS	ALL POST-INSTALLED ANCHORS/ DOWELS SHALL BE SPECIALLY INSPECTED AS REQUIRED BY TABLE 1705.3 ITEM 4 AND AS REQUIRED BY THE APPROVED ICC-ES REPORT	
EPOXY OR CEMENT GROUTED DOWELS OR ANCHORS	-OBSERVE DRILLED HOLES AFTER CLEANING AND INSTALLATION OF ANCHOR -ANCHORS SUBJECT TO SUSTAINED TENSION SHALL BE CONTINUOUSLY INSPECTED AND INSTALLED BY A CERTIFIED INSTALLER IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS AND ACI 318, CHAPTER D	

### SHOP DRAWINGS

- SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED FOR REVIEW PRIOR TO FABRICATION:
  - REINFORCING STEEL
  - STRUCTURAL STEEL
  - PLYWOOD WEB JOISTS
  - WOOD ROOF TRUSSES
- THE CONTRACTOR SHALL SUBMIT CONCRETE WALL ELEVATION DRAWINGS OF AT LEAST 1/8" = 1'-0" SCALE INDICATING LOCATIONS OF CONNECTION EMBEDMENTS AND WALL OPENINGS FOR REVIEW PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE WITH REINFORCEMENT DRAWINGS.
- DIMENSIONS AND QUANTITIES ARE NOT REVIEWED BY THE ENGINEER OF RECORD; THEREFORE, THEY SHALL BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL REVIEW AND STAMP DRAWINGS PRIOR TO REVIEW BY THE ENGINEER OF RECORD. CONTRACTOR SHALL REVIEW DRAWINGS FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND ALL SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO. SUBMITTALS SHALL INCLUDE ONE ELECTRONIC COPY TO BE MARKED AND RETURNED.
- SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS. THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT, BY INDICATING WHICH MATERIAL IS INTENDED TO BE FURNISHED AND INSTALLED, AND BY DETAILING THE INTENDED FABRICATION AND INSTALLATION METHODS. IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SHOP DRAWINGS SUBMITTALS AND THE CONTRACT DOCUMENTS ARE DISCOVERED EITHER PRIOR TO OR AFTER SHOP DRAWING SUBMITTALS ARE PROCESSED BY THE ENGINEER, THE DESIGN DRAWINGS AND SPECIFICATIONS SHALL CONTROL AND SHALL BE FOLLOWED.
- SHOP DRAWINGS FOR DEFERRED SUBMITTALS THAT ARE DEFINED AS DESIGN-BUILD COMPONENTS IN THE CONSTRUCTION DOCUMENTS SHALL INCLUDE THE DESIGNING PROFESSIONAL ENGINEER'S STAMP FOR THE JURISDICTION WHERE THE PROJECT IS LOCATED AND SHALL BE APPROVED BY THE COMPONENT DESIGNER PRIOR TO CURSORY REVIEW BY THE ENGINEER OF RECORD FOR LOADS IMPOSED ON THE BASIC STRUCTURE. THE COMPONENT DESIGNER IS RESPONSIBLE FOR CODE CONFORMANCE AND ALL NECESSARY CONNECTIONS NOT SPECIFICALLY CALLED OUT ON ARCHITECTURAL OR STRUCTURAL DRAWINGS. SHOP DRAWINGS SHALL INDICATE MAGNITUDE AND DIRECTION OF ALL LOADS IMPOSED ON BASIC STRUCTURE. DESIGN CALCULATIONS SHALL BE INCLUDED IN THE SUBMITTAL.

### WINTER CONSTRUCTION

- ALL SOIL BELOW FOOTINGS SHALL BE PROTECTED FROM FREEZING BY ALL NECESSARY MEANS (e.g. TEMPORARY HEAT AND BLANKETS, TEMPERATURE PROBES, ETC.).
- ALL CONCRETE SHALL BE PREVENTED FROM FREEZING AFTER POURING, AS DIRECTED BY THE CONCRETE SPECIAL INSPECTOR, BY ALL NECESSARY MEANS (e.g. TEMPORARY HEAT, BLANKETS, ETC.).
- ALL BACKFILL MUST BE PLACED ON UNFROZEN GROUND, IN UNFROZEN STATE AND COMPACTED PER THE GEOTECHNICAL REPORT.



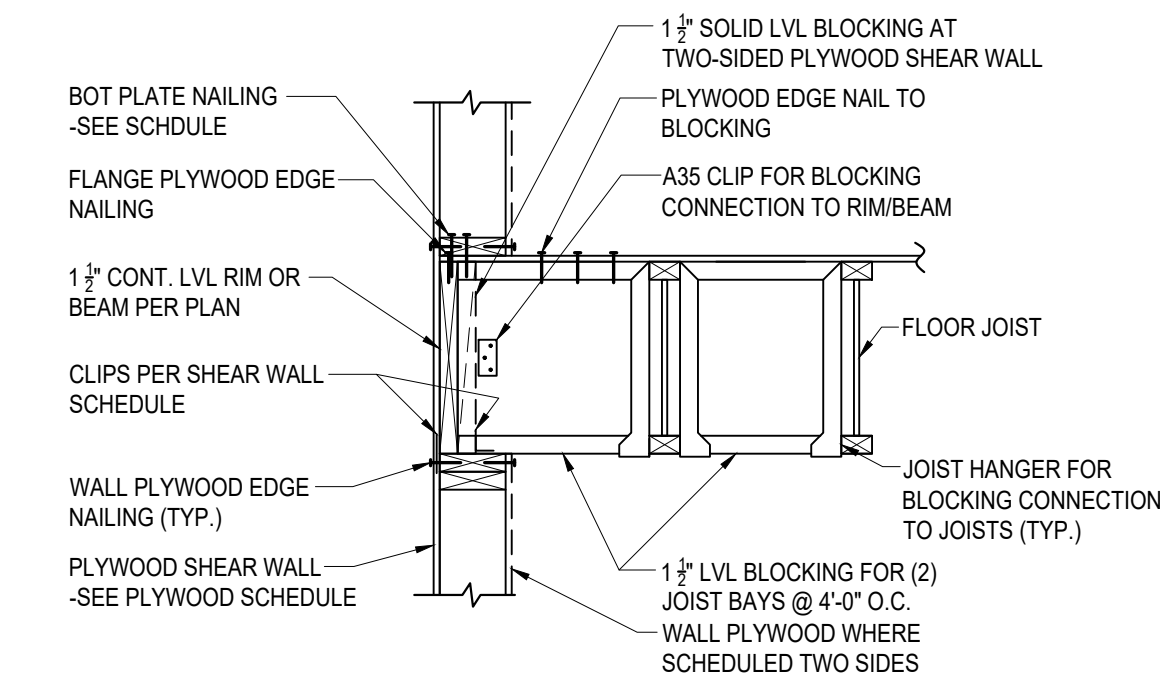




TYPICAL NAILING SCHEDULE	
CONNECTION	NAILING
JOIST TO SILL OR GIRDER, TOENAIL	(3) 8d
BRIDGING TO JOIST, TOENAIL EACH END	(2) 8d
SOLE PLATE TO JOIST OR BLOCKING, TOENAIL	16d @ 18" O.C.
TOP PLATE TO STUD, END NAIL	(2) 16d
STUD TO SOLE PLATE	(4) 8d TOENAIL OR (2) 16d END NAIL
DOUBLE STUDS, FACE NAIL	16d @ 24" O.C.
DOUBLE TOP PLATES, FACE NAIL	16d @ 18" O.C.
TOP PLATE INTERSECTIONS, FACE NAIL	(2) 16d
CONTINUOUS HEADER, TWO PIECES	16d @ 18" O.C. ALONG EACH EDGE
CEILING JOISTS TO PLATE, TOENAIL	(3) 8d
RAFTER TO TRUSS TO PLATE, TOENAIL	(3) 8d
BUILT-UP CORNER STUDS	16d @ 12" O.C. EACH LAYER STAGGERED
BUILT-UP GIRDER AND BEAMS	16d @ 12" O.C. EACH LAYER STAGGERED
BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE, TOENAIL	(3) 8d
RIM JOIST TOP PLATE, TOENAIL	8d @ 6" O.C.
POST AND BEAM OR GIRDER CONSTRUCTION	PROVIDE POSITIVE CONNECTION AGAINST UPLIFT AND LATERAL DISPLACEMENT
BUILT-UP RIM JOIST	(2) ROWS 16d @ 12" O.C.

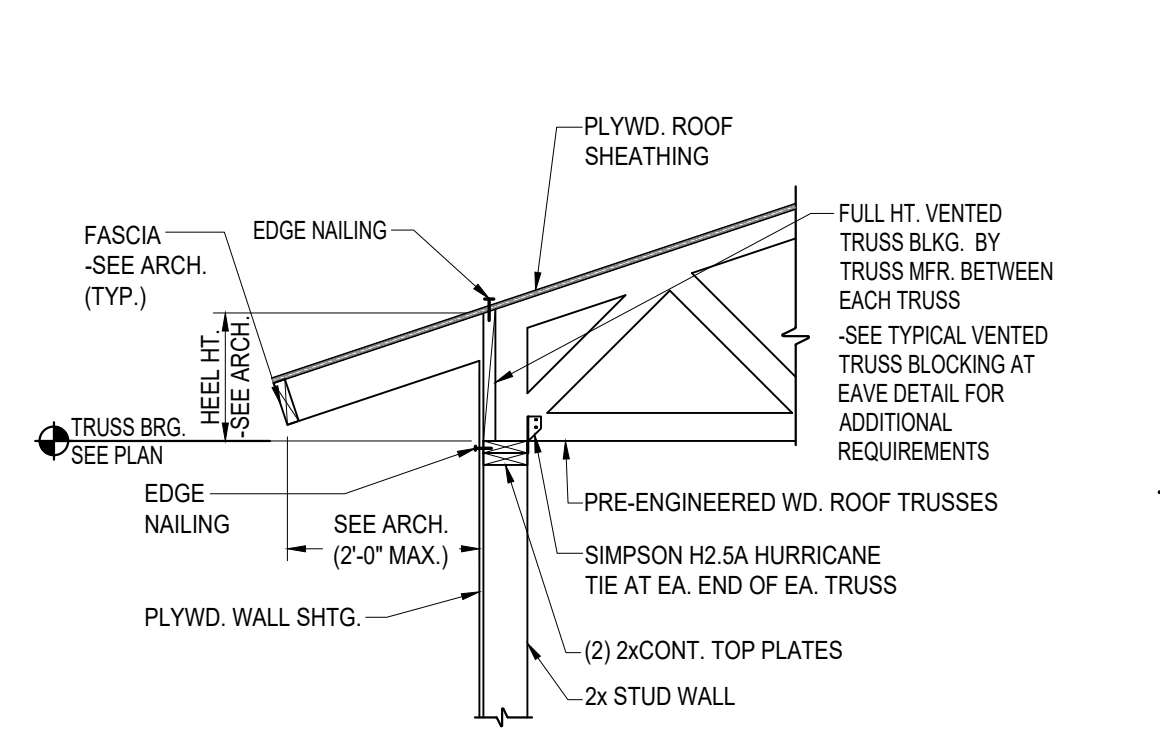
NOTES:  
1. REFER TO 2012 IBC TABLE 2304.9.1 FOR ADDITIONAL NAILING REQUIREMENTS.

1 S1.2 TYPICAL NAILING SCHEDULE  
NO SCALE

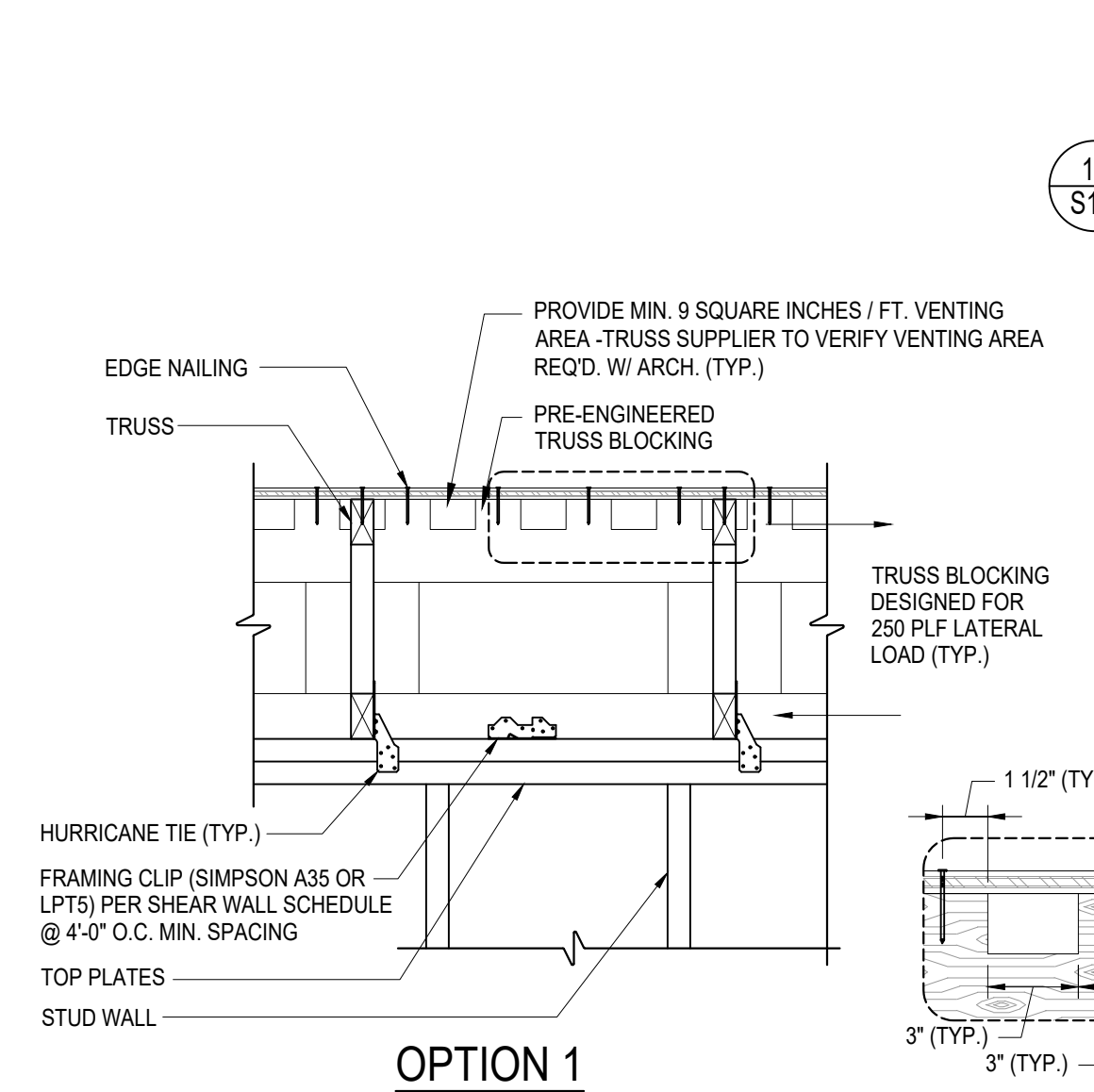


WALL PARALLEL TO JOISTS

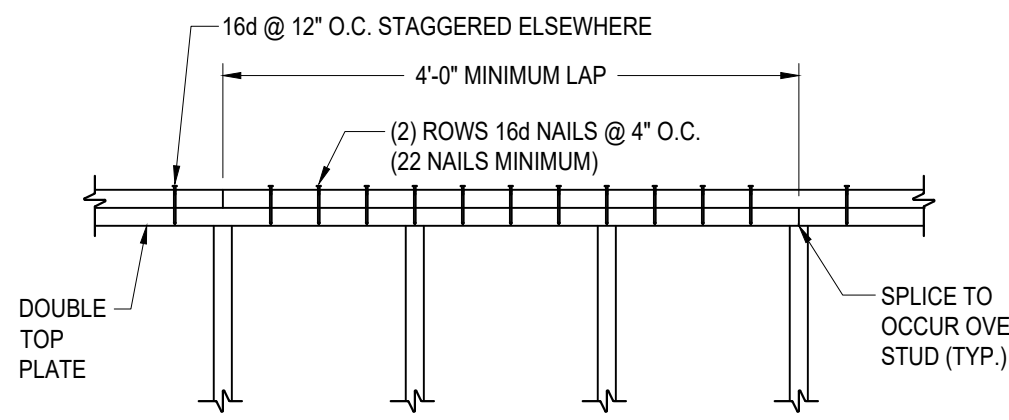
7 S1.2 TYPICAL FLOOR TO EXTERIOR WALL DETAIL  
NO SCALE



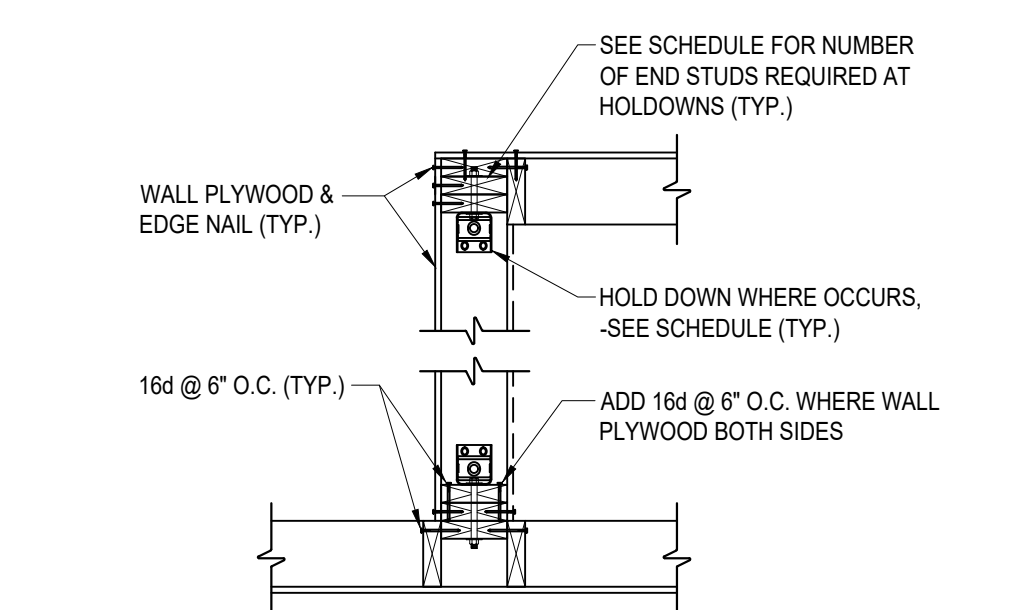
11 S1.2 TYPICAL EAVE DETAIL @ WOOD STUD WALL  
NO SCALE



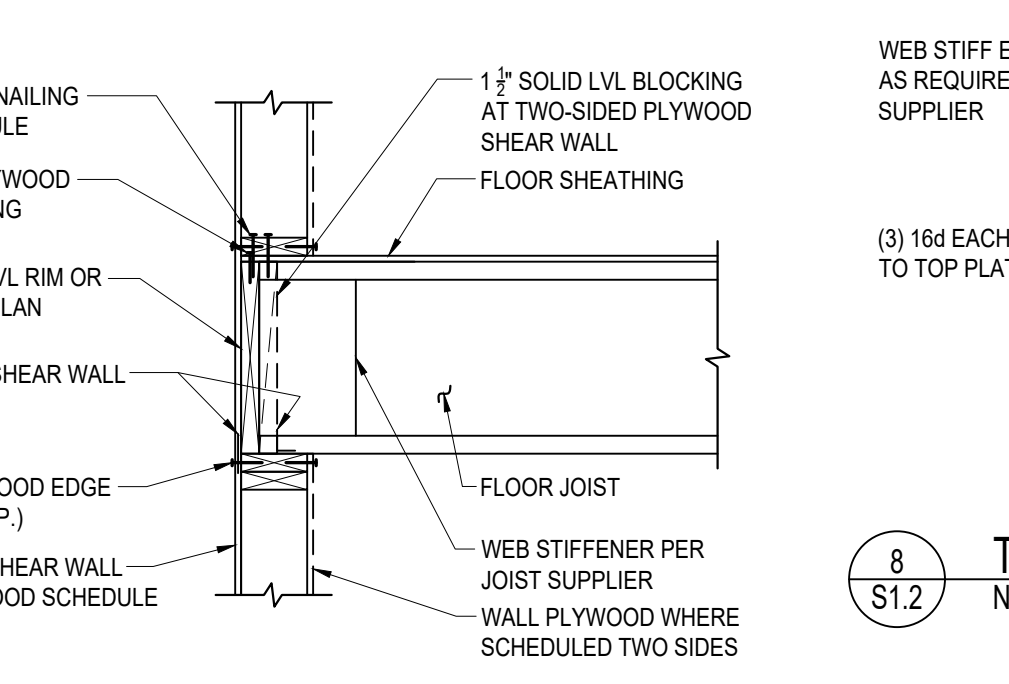
15 S1.2 TYPICAL VENTED TRUSS BLOCKING @ EAVE  
1\"/>



2 S1.2 TYPICAL TOP PLATE LAP DETAIL  
NO SCALE

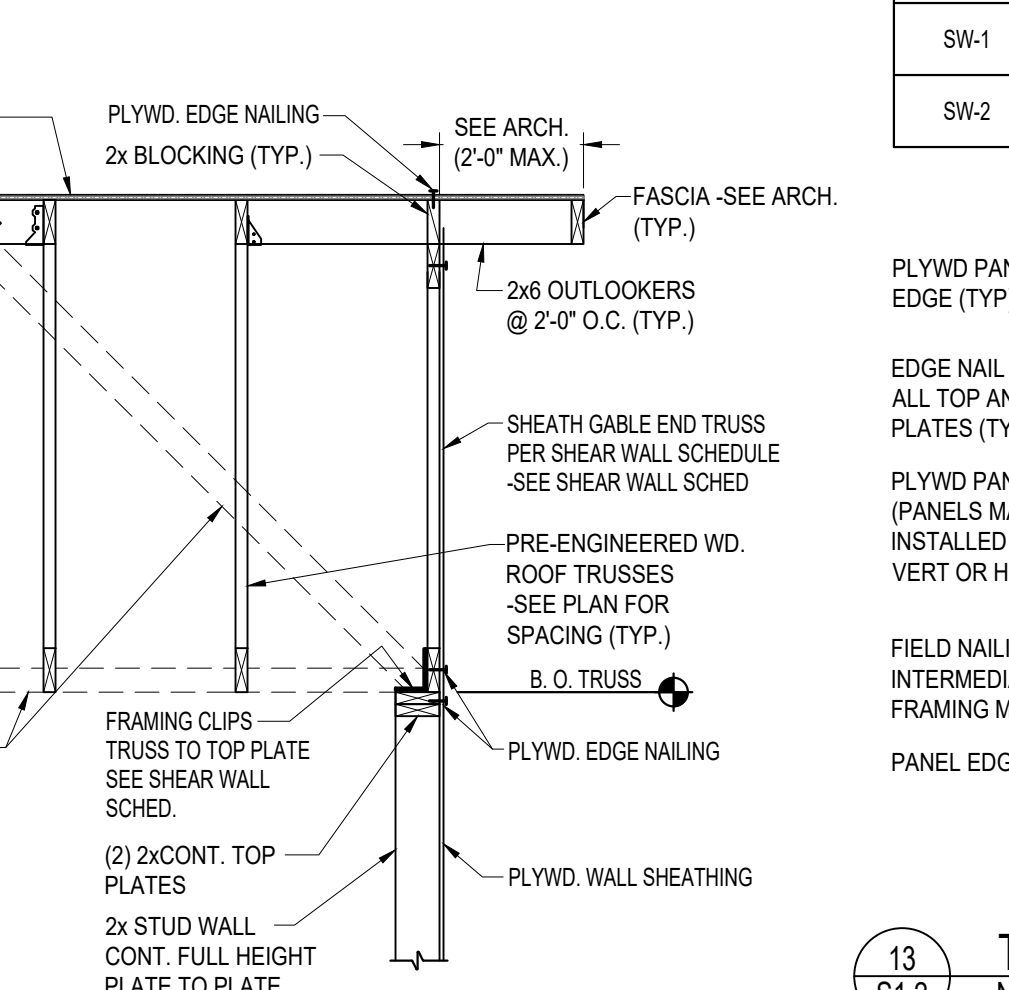


3 S1.2 TYPICAL WALL INTERSECTION DETAIL  
NO SCALE

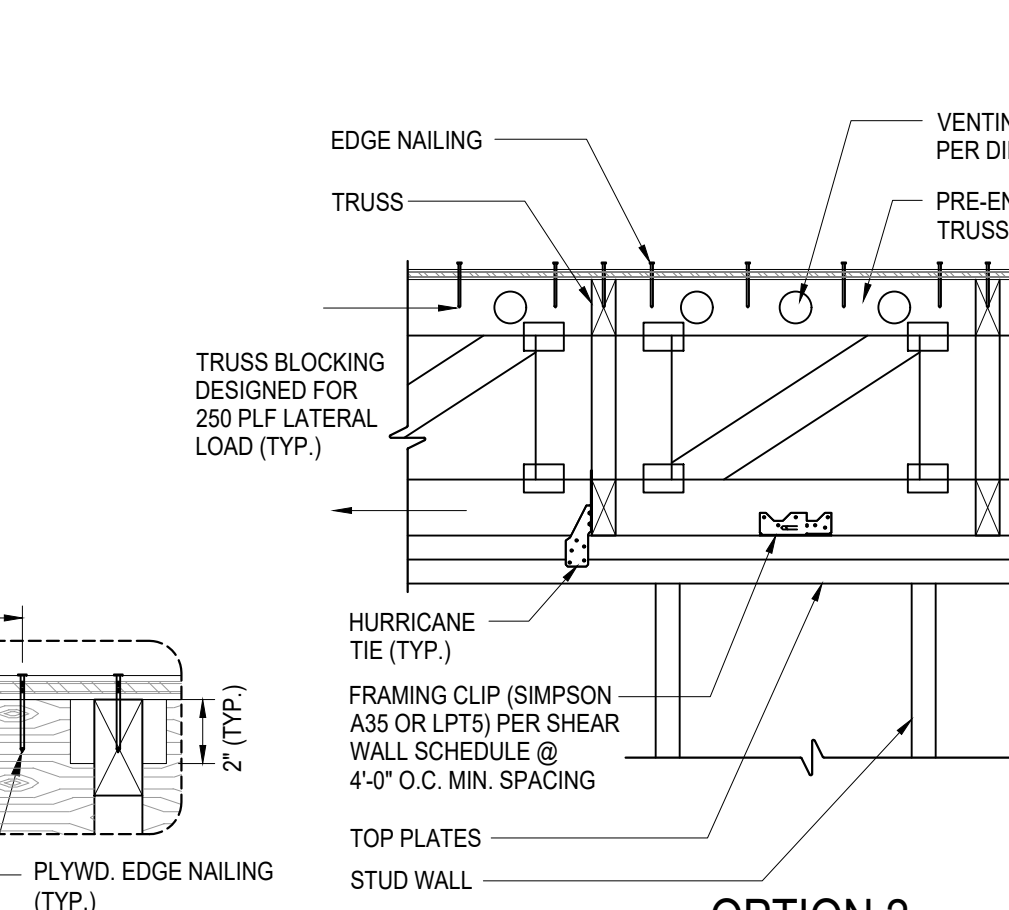


WALL PERPENDICULAR TO JOISTS

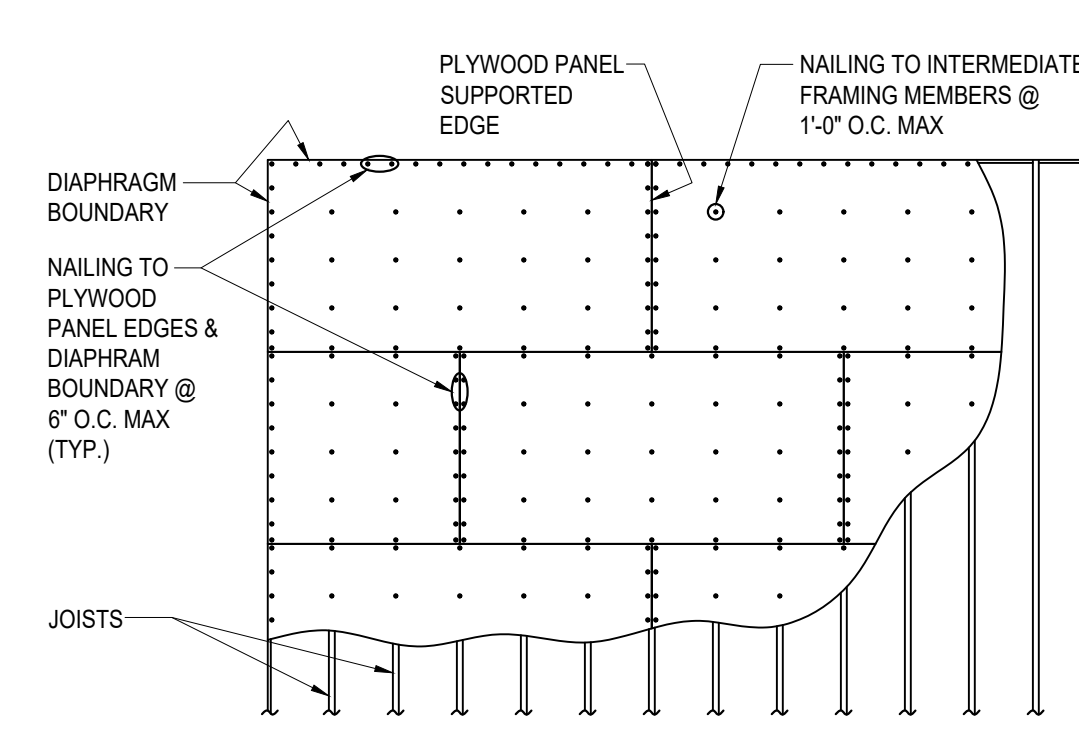
12 S1.2 TYPICAL GABLE END DETAIL @ WOOD STUD WALL  
NO SCALE



12 S1.2 TYPICAL GABLE END DETAIL @ WOOD STUD WALL  
NO SCALE

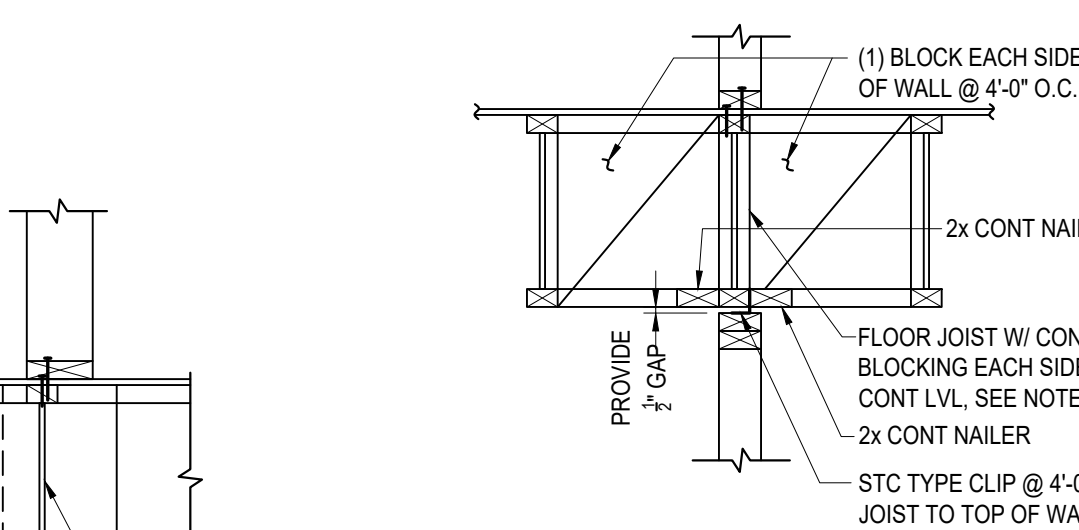


15 S1.2 TYPICAL VENTED TRUSS BLOCKING @ EAVE  
1\"/>



NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.

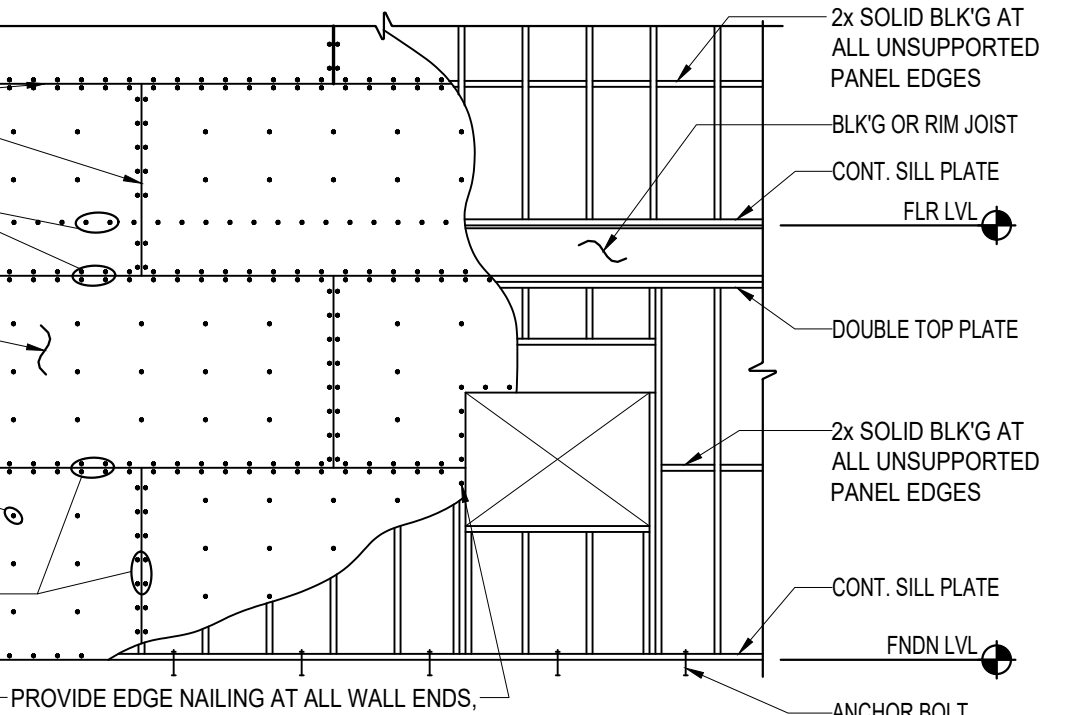
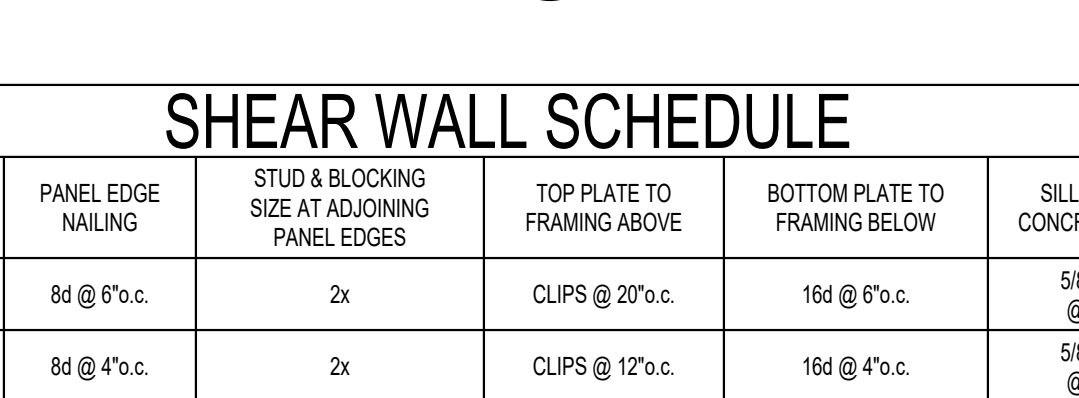
4 S1.2 TYPICAL UNBLOCKED PLYWOOD ROOF/FLOOR  
NO SCALE



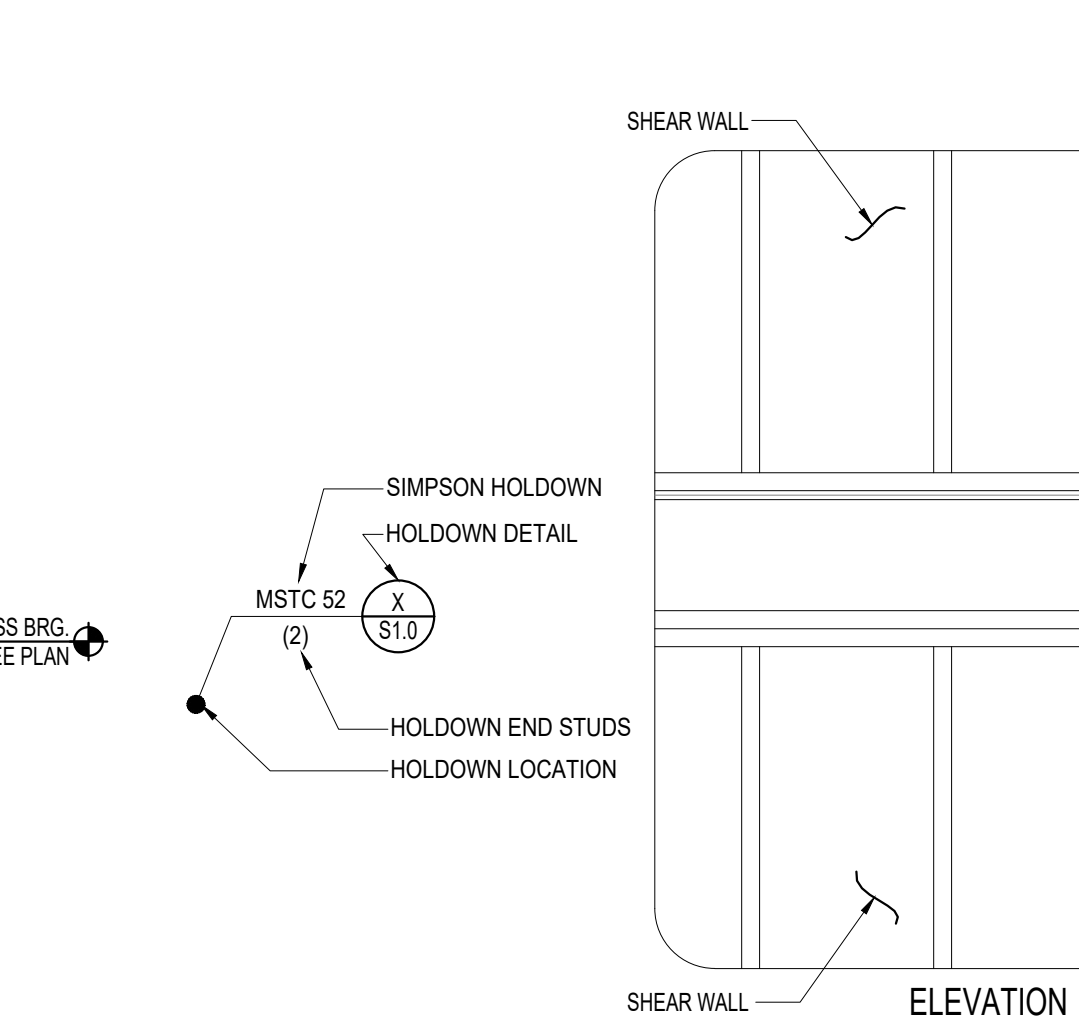
WALL PARALLEL TO JOISTS

NOTES:  
1. PROVIDE DOUBLE JOIST UNDER ALL PARALLEL PARTITIONS THAT EXTEND OVER MORE THAN HALF THE JOIST LENGTH.

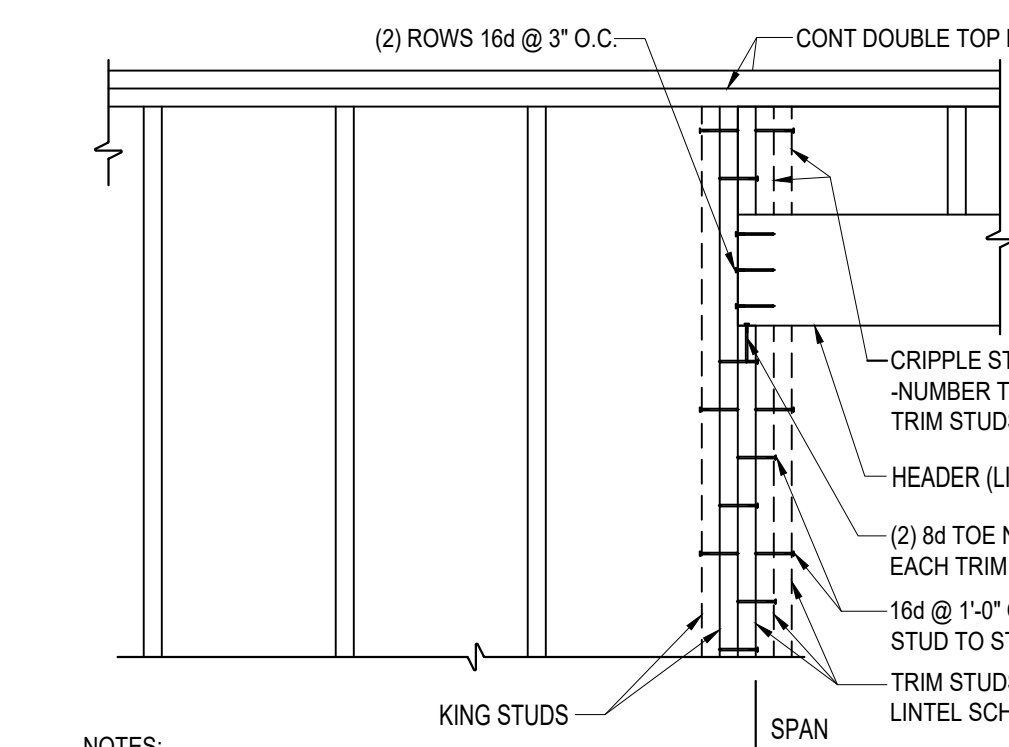
8 S1.2 TYPICAL BEARING STUD WALL DETAIL  
NO SCALE



9 S1.2 TYPICAL NON-BEARING STUD WALL DETAIL  
NO SCALE

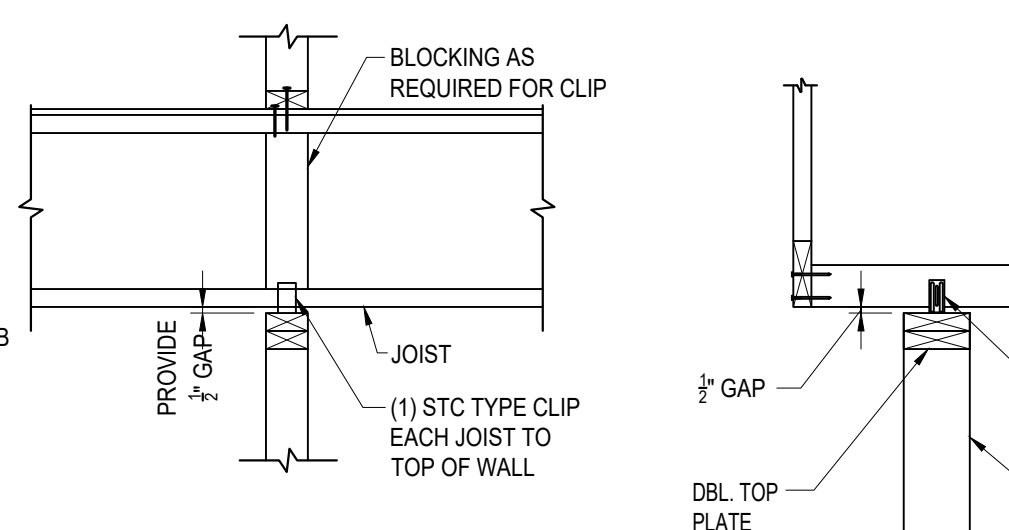


16 S1.2 TYPICAL HOLD-DOWN @ FLOOR  
NO SCALE



NOTES:  
1. UNLESS OTHERWISE NOTED ON PLAN:  
-PROVIDE (1) KING STUD AT OPENINGS < 4'-0\"/>

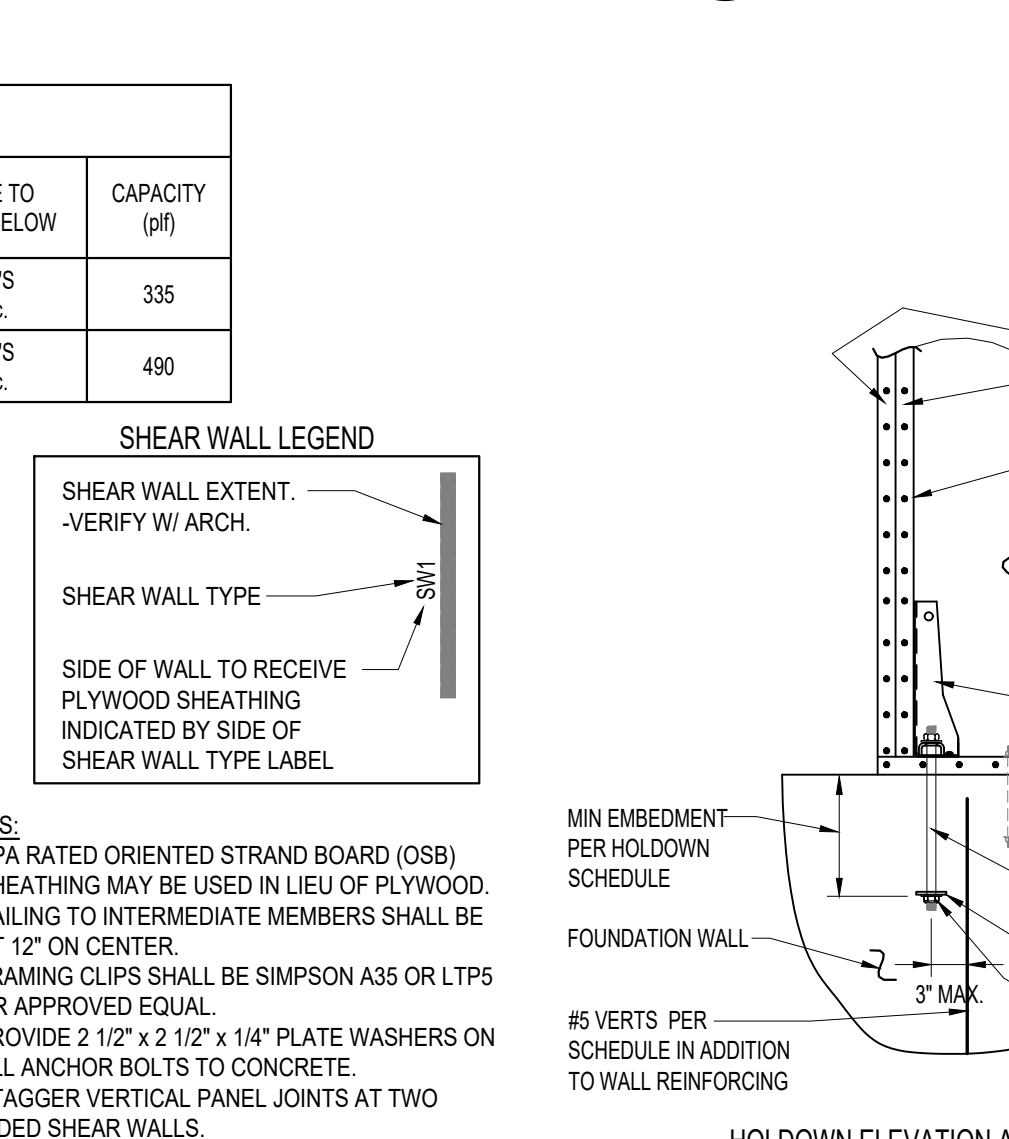
5 S1.2 TYPICAL HEADER (LINTEL) DETAIL  
NO SCALE



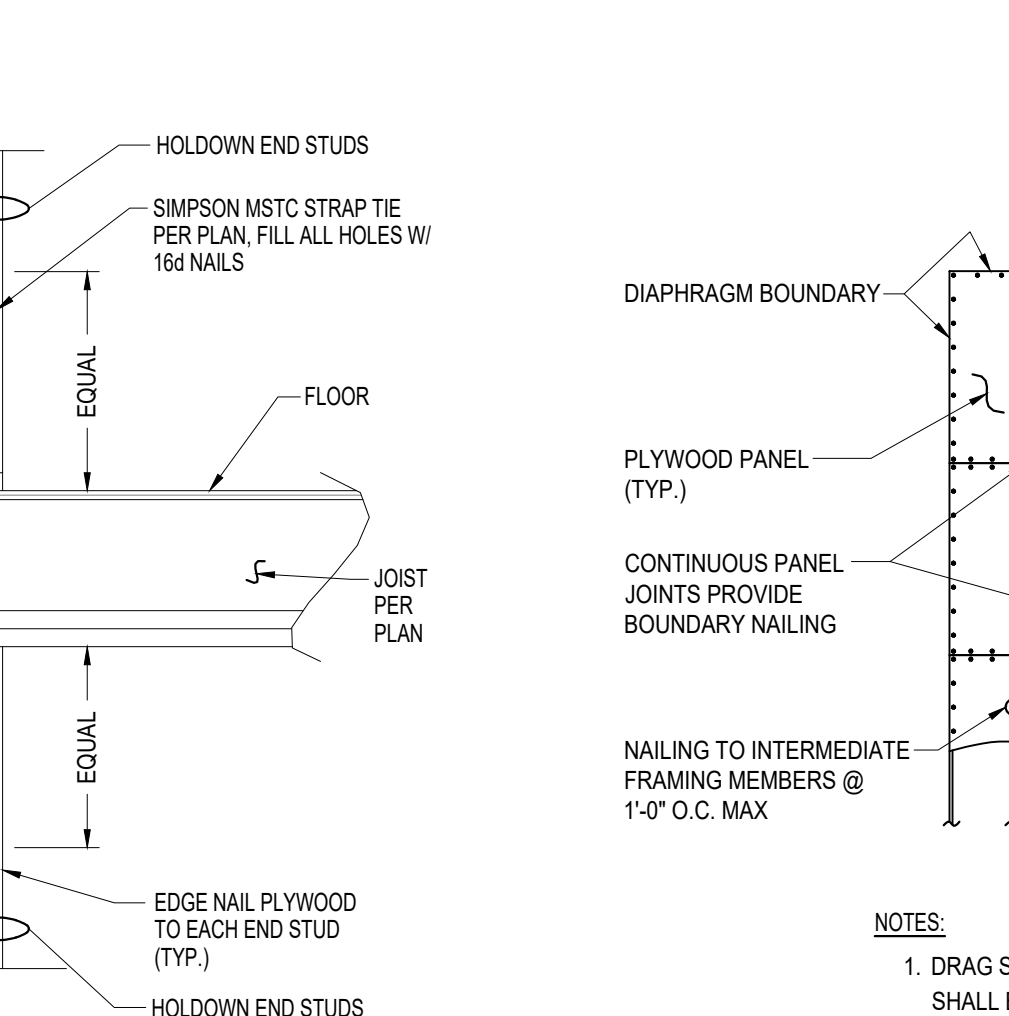
WALL PERPENDICULAR TO TRUSS

NOTES:  
1. SIMPSON STC TYPE CLIP EACH TRUSS BLOCKING TO TOP OF WALL

10 S1.2 TYPICAL NON-BEARING STUD WALL DETAIL  
NO SCALE

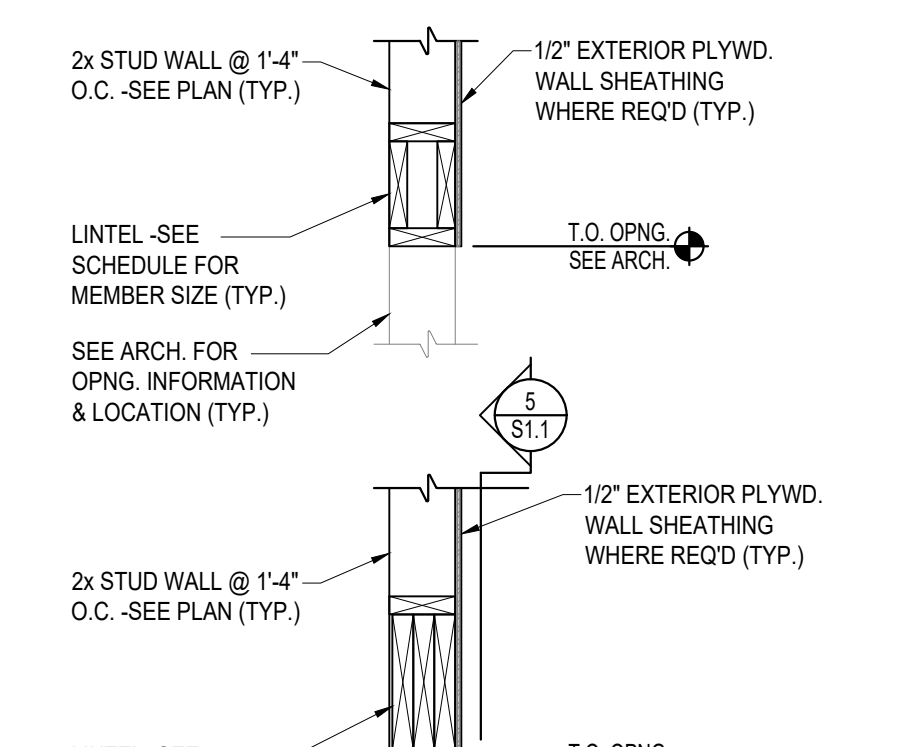


14 S1.2 TYPICAL HOLD-DOWN TO FOUNDATION  
NO SCALE



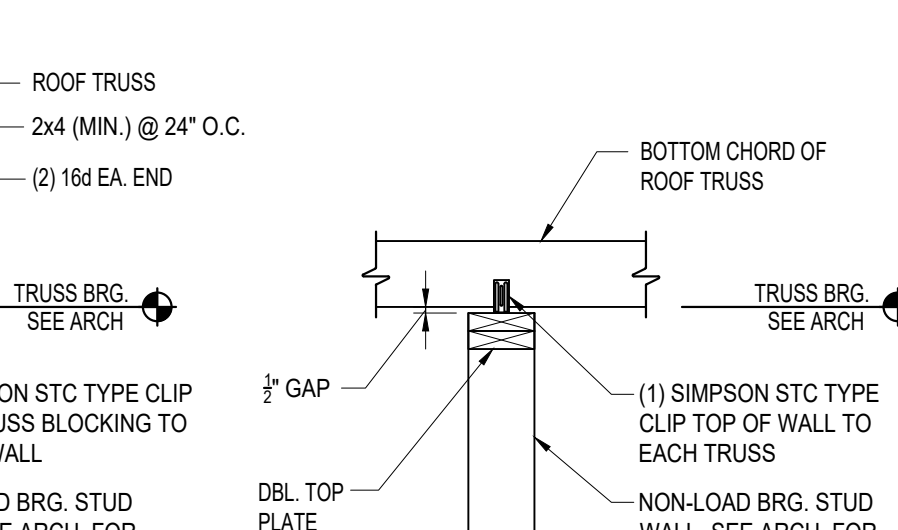
17 S1.2 TYPICAL BLOCKED PLYWOOD ROOF/FLOOR  
NO SCALE

NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.



NOTES:  
1. UNLESS OTHERWISE NOTED ON PLAN:  
-PROVIDE (1) KING STUD AT OPENINGS < 4'-0\"/>

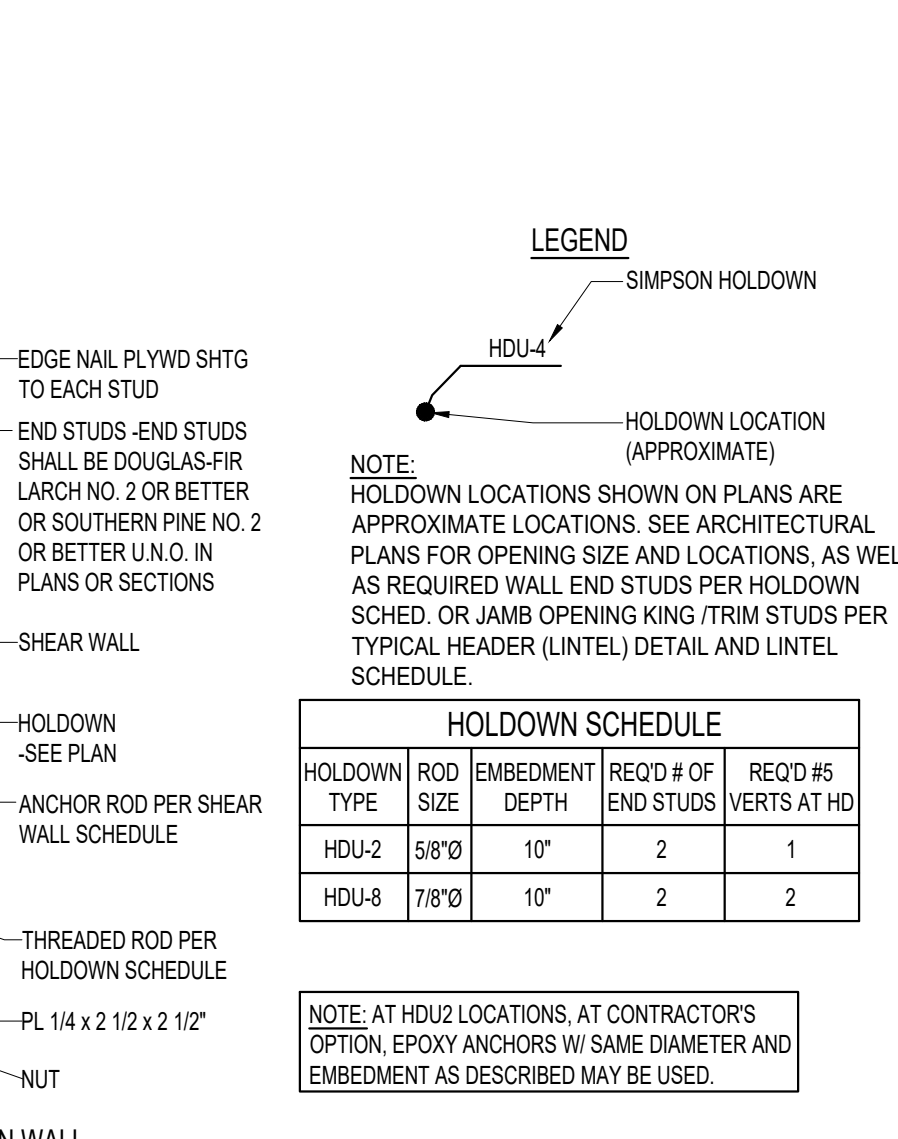
6 S1.1 SECTION @ LINTEL  
3/4\"/>



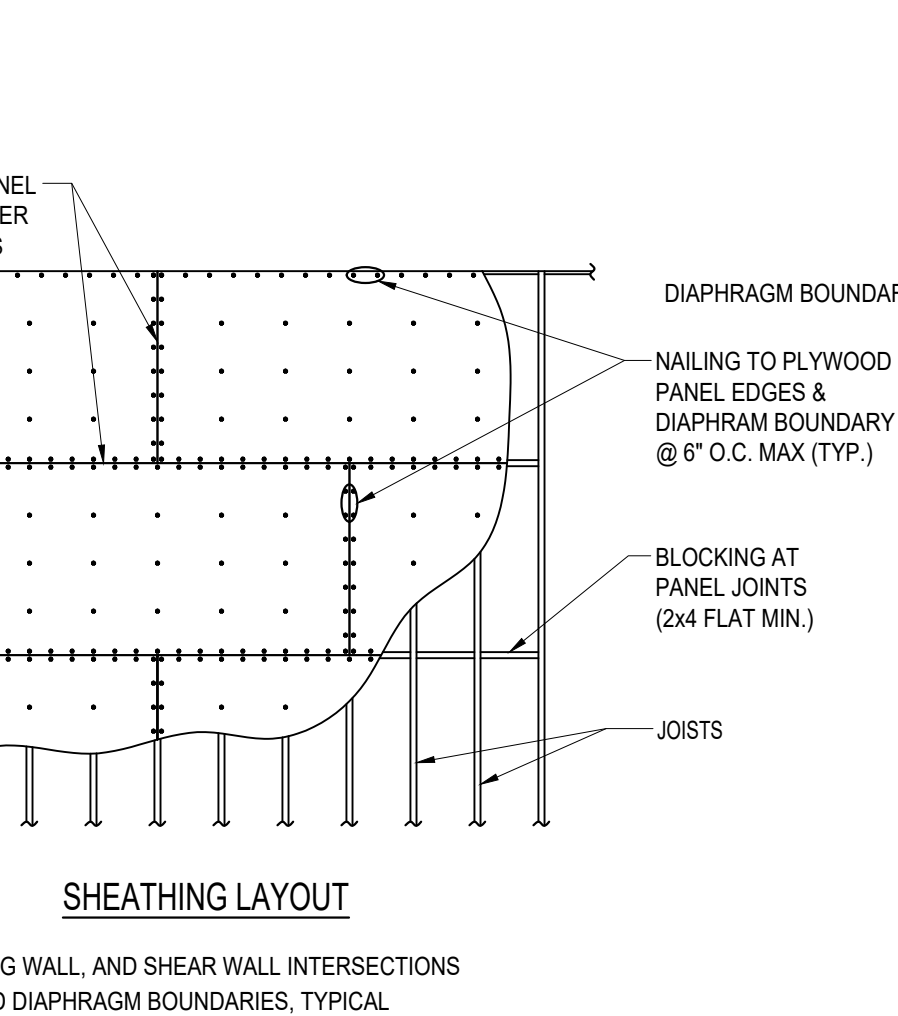
WALL PERPENDICULAR TO TRUSS

NOTES:  
1. SIMPSON STC TYPE CLIP EACH TRUSS BLOCKING TO TOP OF WALL

10 S1.2 TYPICAL NON-BEARING STUD WALL DETAIL  
NO SCALE



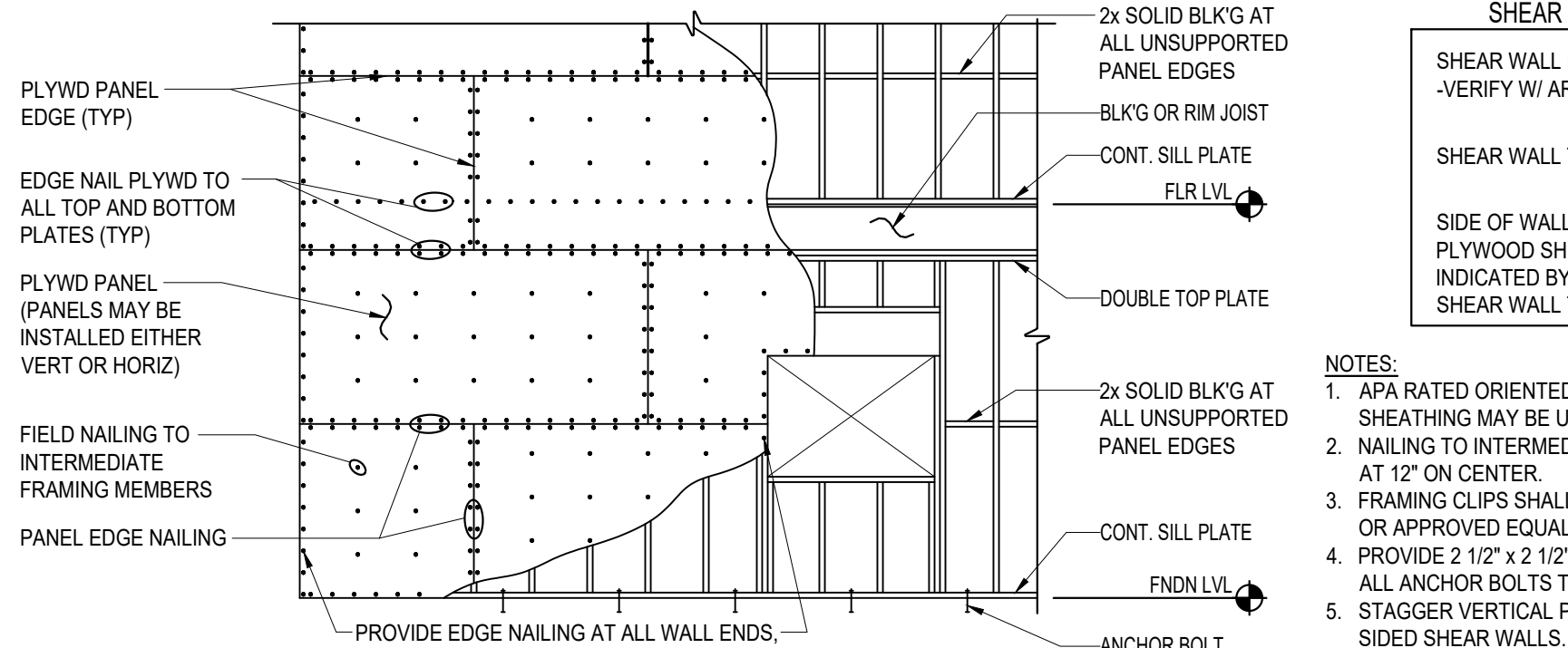
14 S1.2 TYPICAL HOLD-DOWN TO FOUNDATION  
NO SCALE



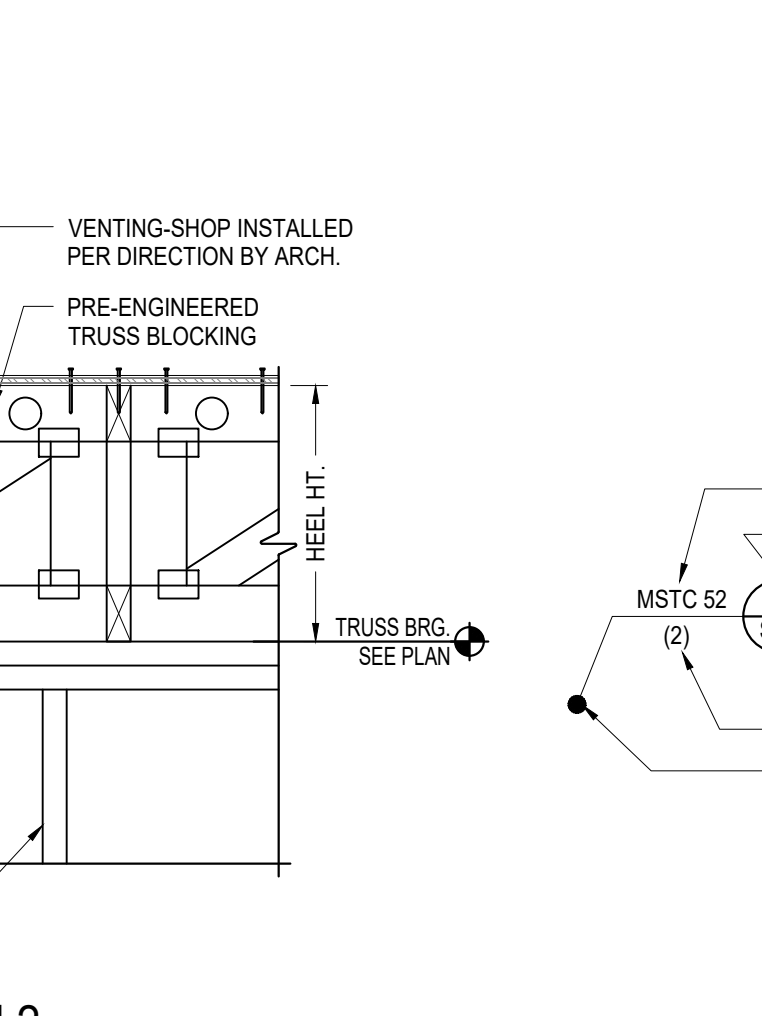
17 S1.2 TYPICAL BLOCKED PLYWOOD ROOF/FLOOR  
NO SCALE

NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.

SHEAR WALL SCHEDULE							
MARK	APA RATED SHEATHING	PANEL EAVE NAILING	STUD & BLOCKING SIZE AT ADJOINING PANEL EDGES	TOP PLATE TO FRAMING ABOVE	BOTTOM PLATE TO FRAMING BELOW	SILL PLATE TO CONCRETE BELOW	CAPACITY (plf)
SW-1	7/16\"/>						

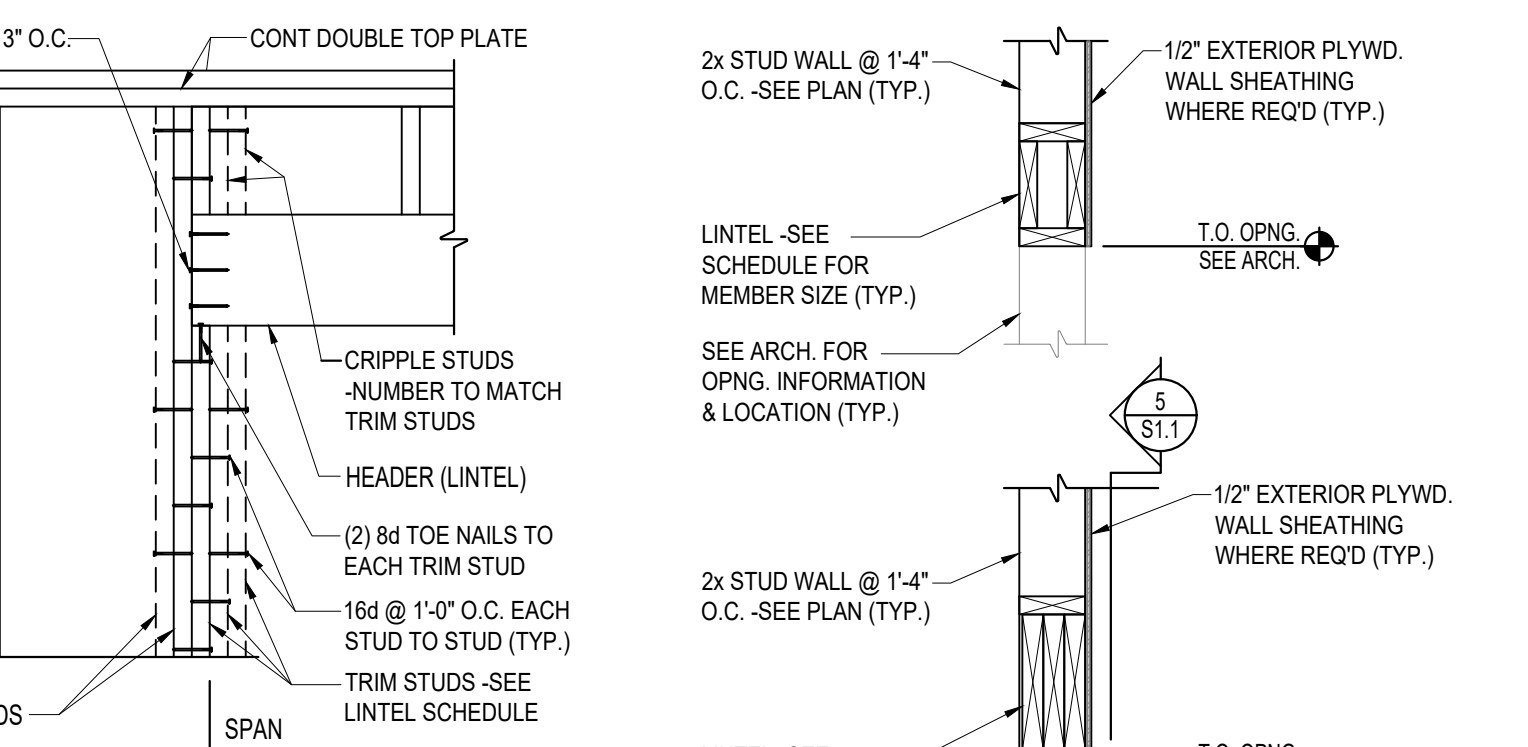


13 S1.2 TYPICAL SHEAR WALL ELEVATION  
NO SCALE



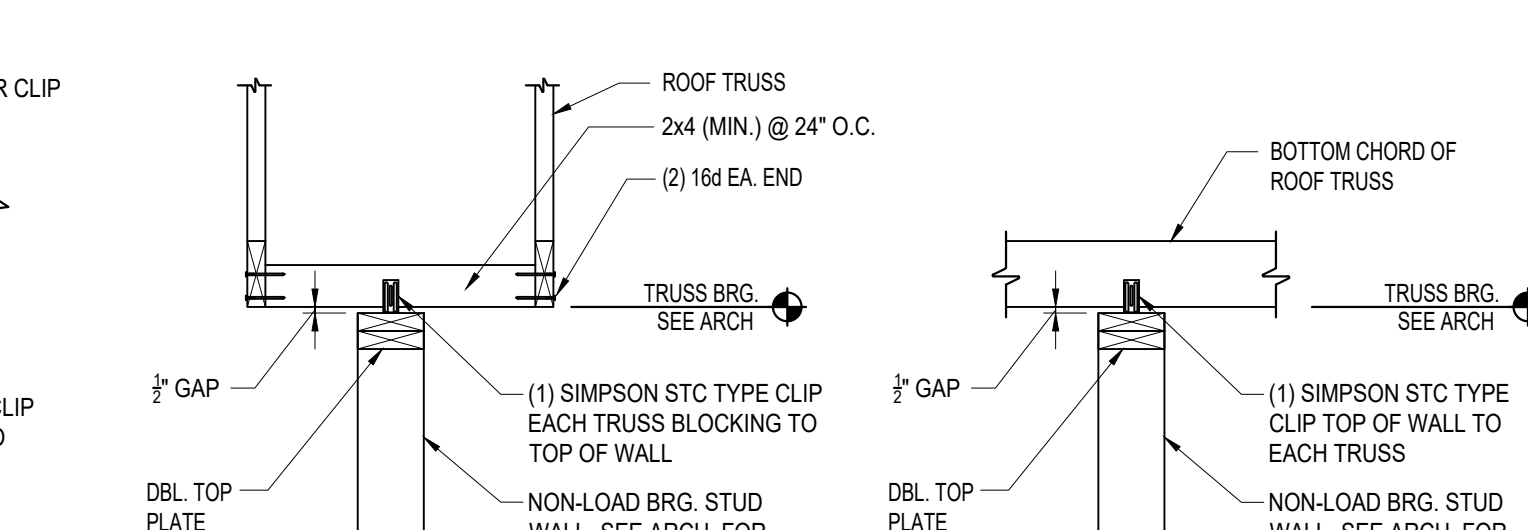
16 S1.2 TYPICAL HOLD-DOWN @ FLOOR  
NO SCALE

NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.



NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.

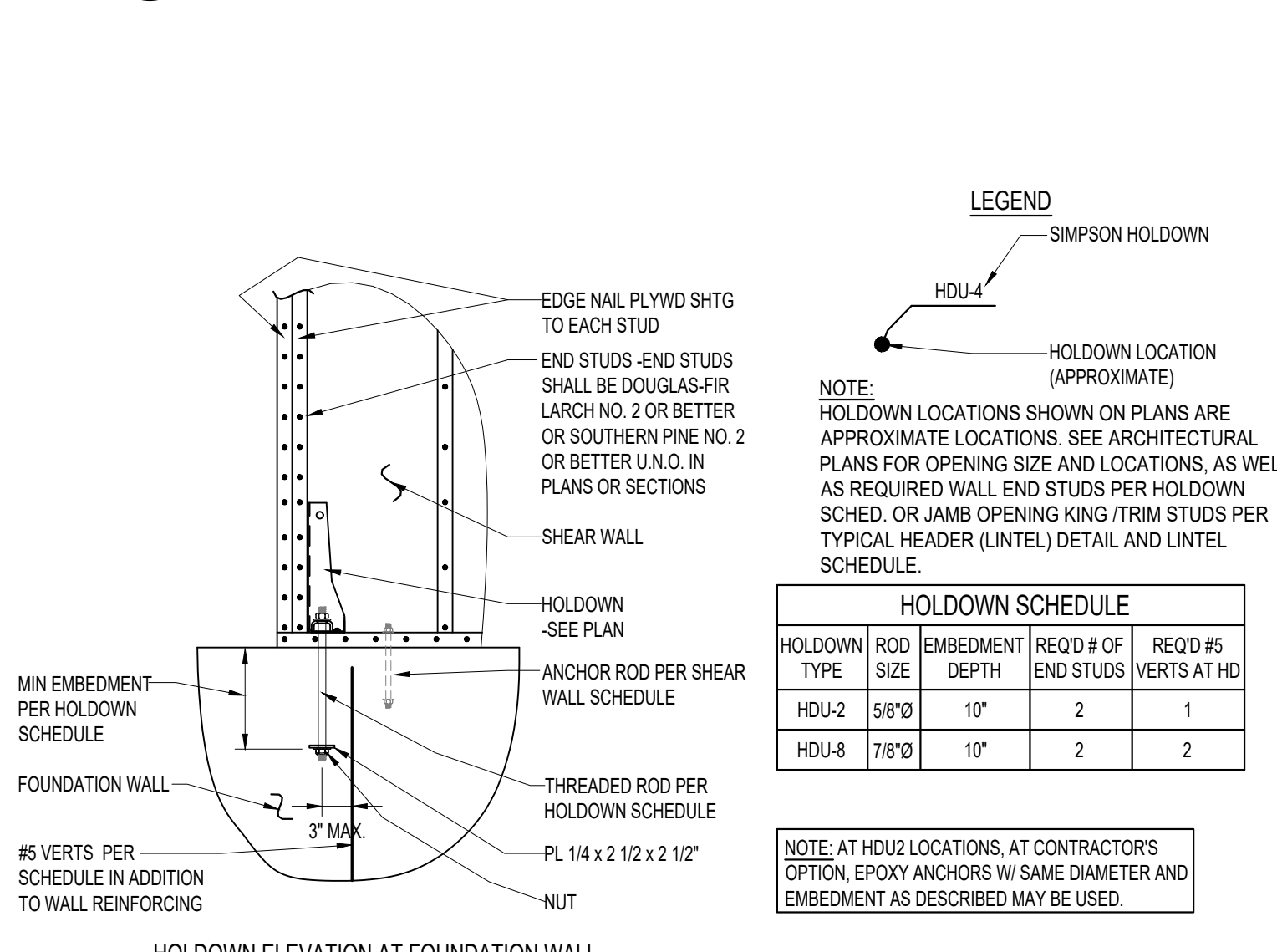
17 S1.2 TYPICAL BLOCKED PLYWOOD ROOF/FLOOR  
NO SCALE



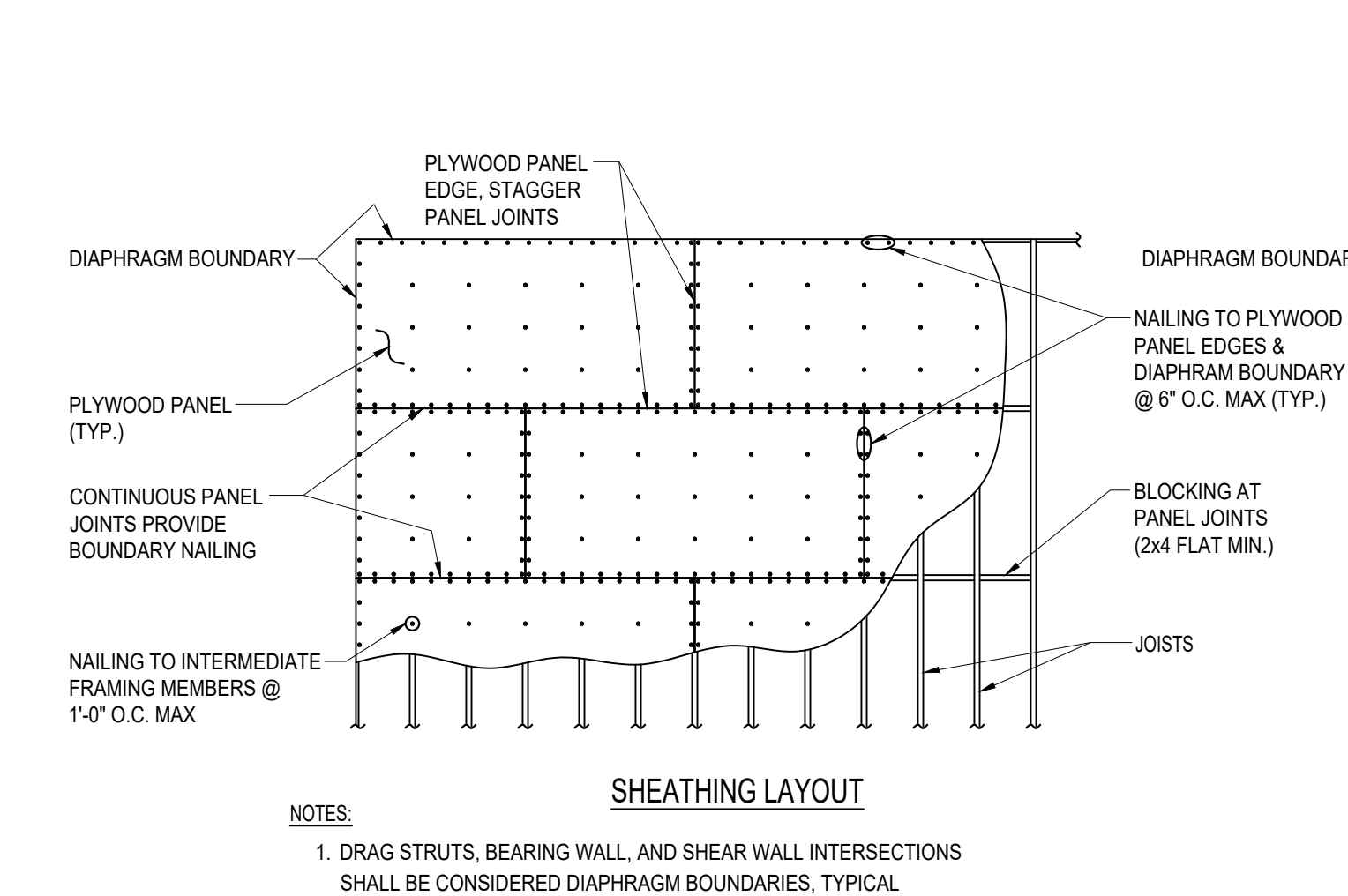
WALL PERPENDICULAR TO TRUSS

NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.

17 S1.2 TYPICAL BLOCKED PLYWOOD ROOF/FLOOR  
NO SCALE



14 S1.2 TYPICAL HOLD-DOWN TO FOUNDATION  
NO SCALE



17 S1.2 TYPICAL BLOCKED PLYWOOD ROOF/FLOOR  
NO SCALE

NOTES:  
1. DRAG STRUTS, BEARING WALL, AND SHEAR WALL INTERSECTIONS SHALL BE CONSIDERED DIAPHRAGM BOUNDARIES, TYPICAL.

**SAFE HAVEN  
WOMEN'S  
SHELTER**

Duluth, MN 55812

project #: 21-368  
date: 09/24/2021  
drawn by: CAJ / HMM  
checked by: MRU

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

signature: *Mark R. Udd*  
printed name: MARK R. UDD

reg. #: 40443  
sign date: 09/24/2021

revision / issue no. date















# SAFE HAVEN WOMEN'S SHELTER

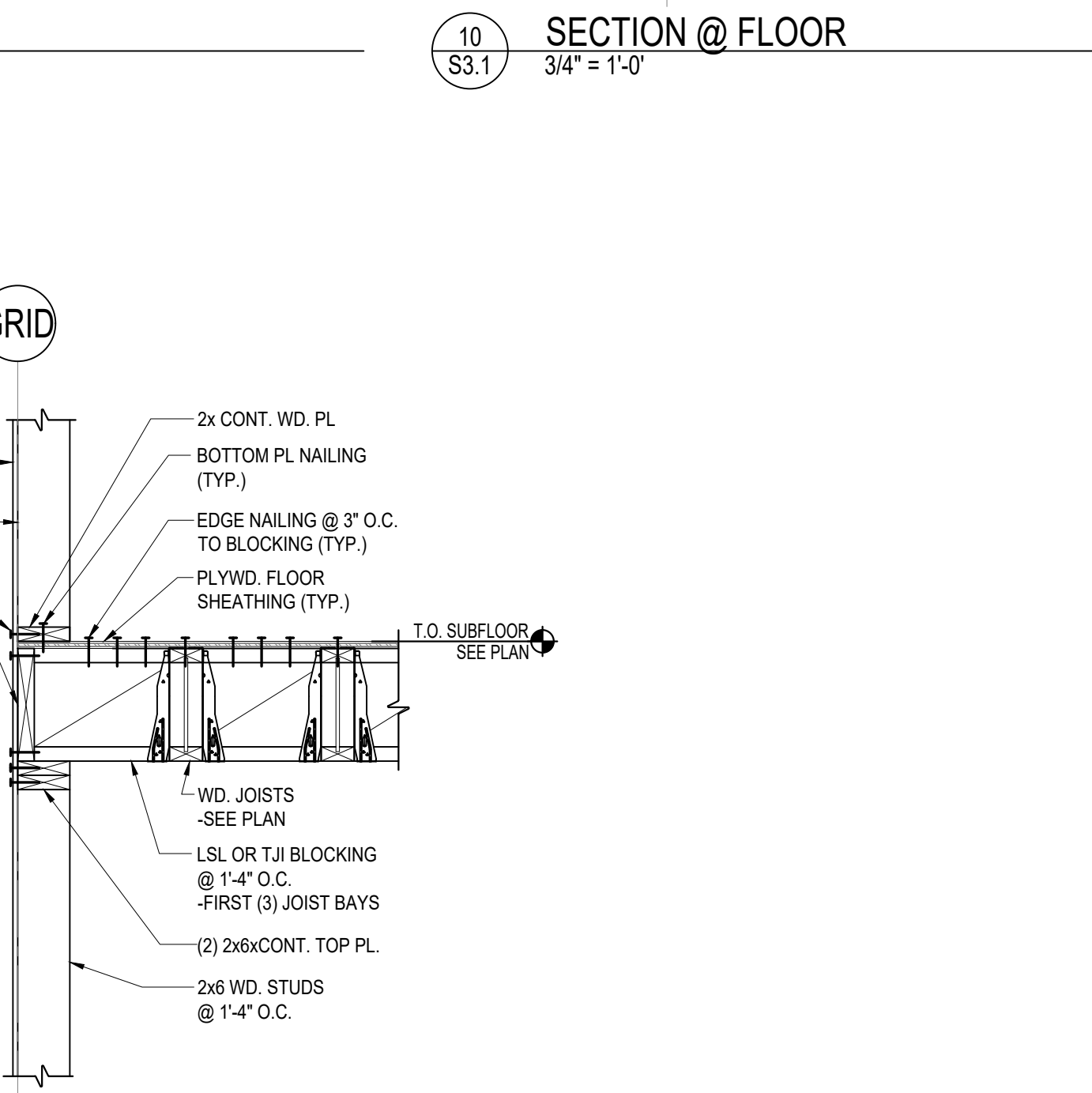
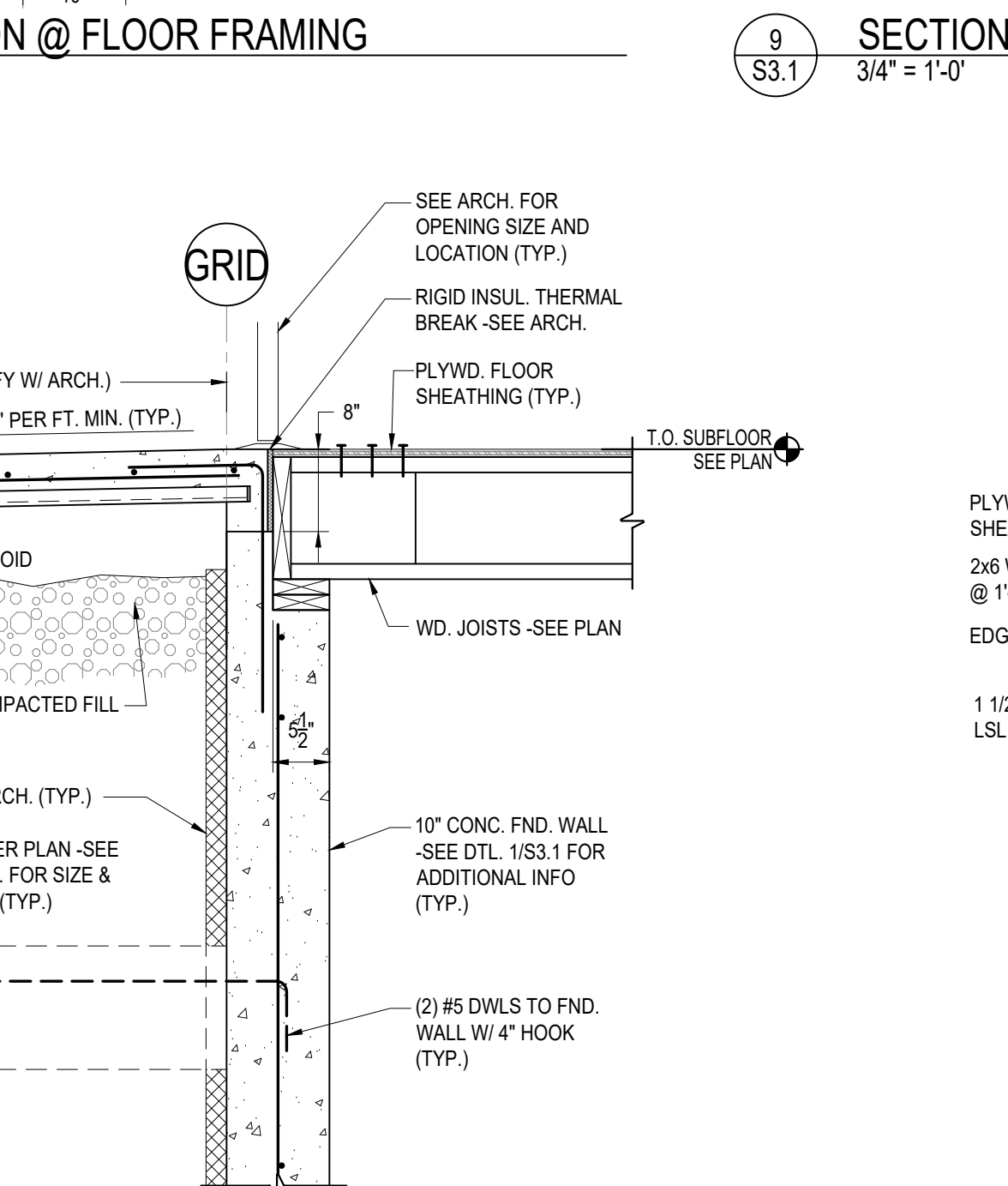
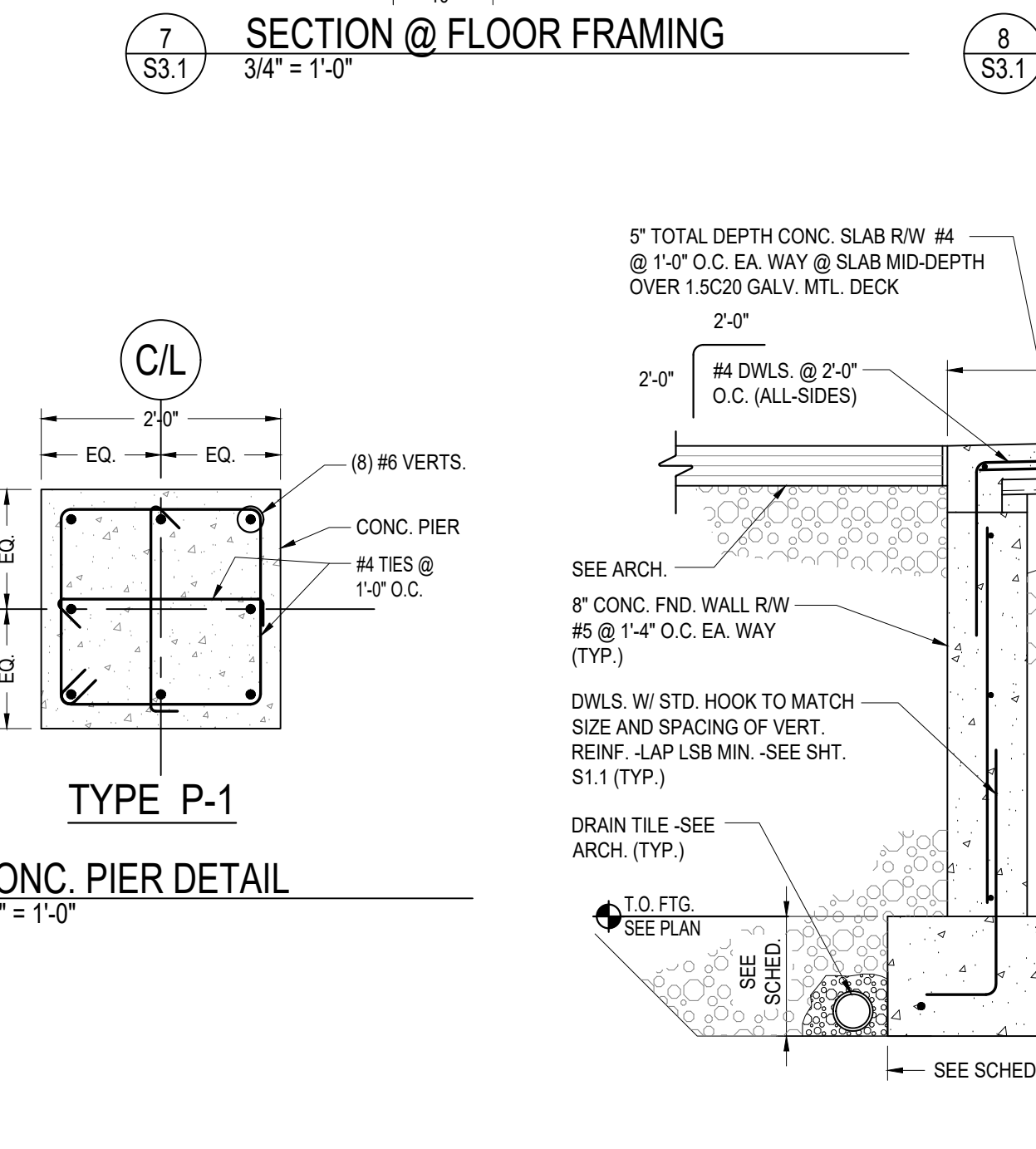
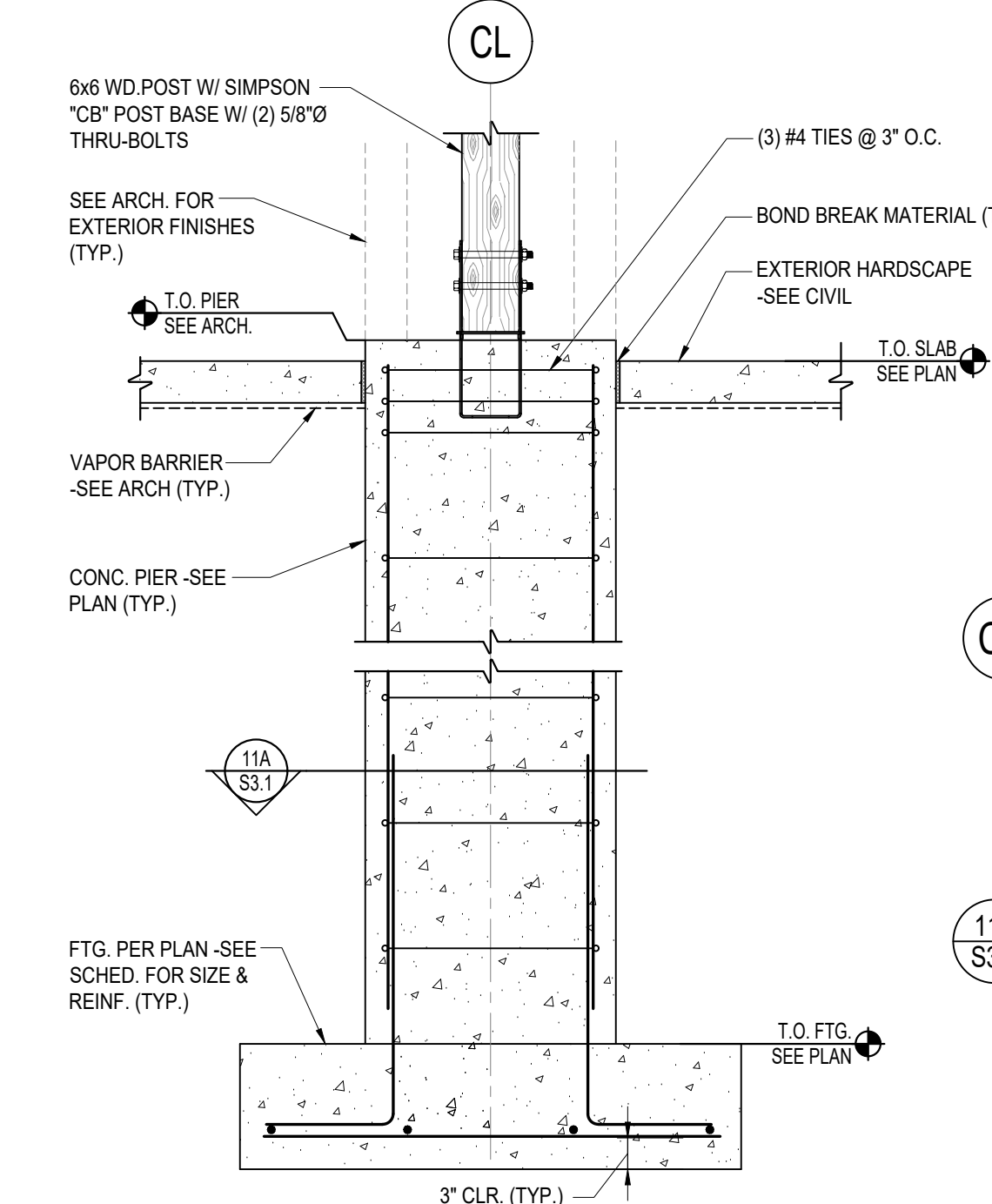
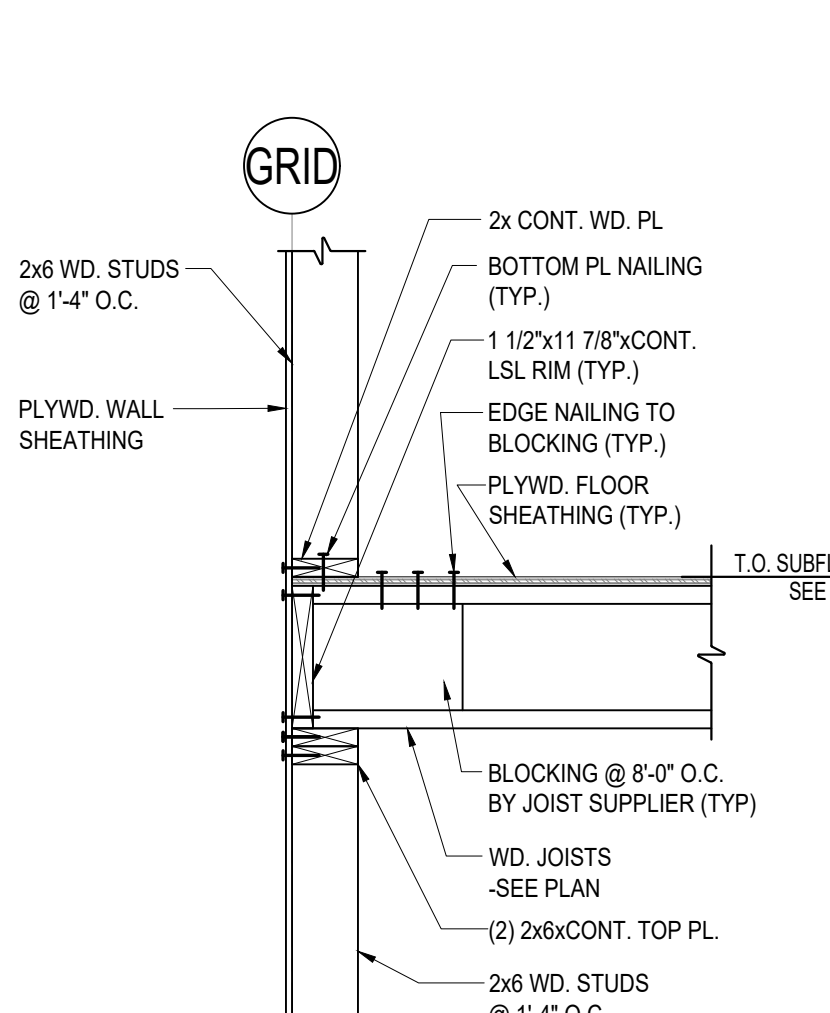
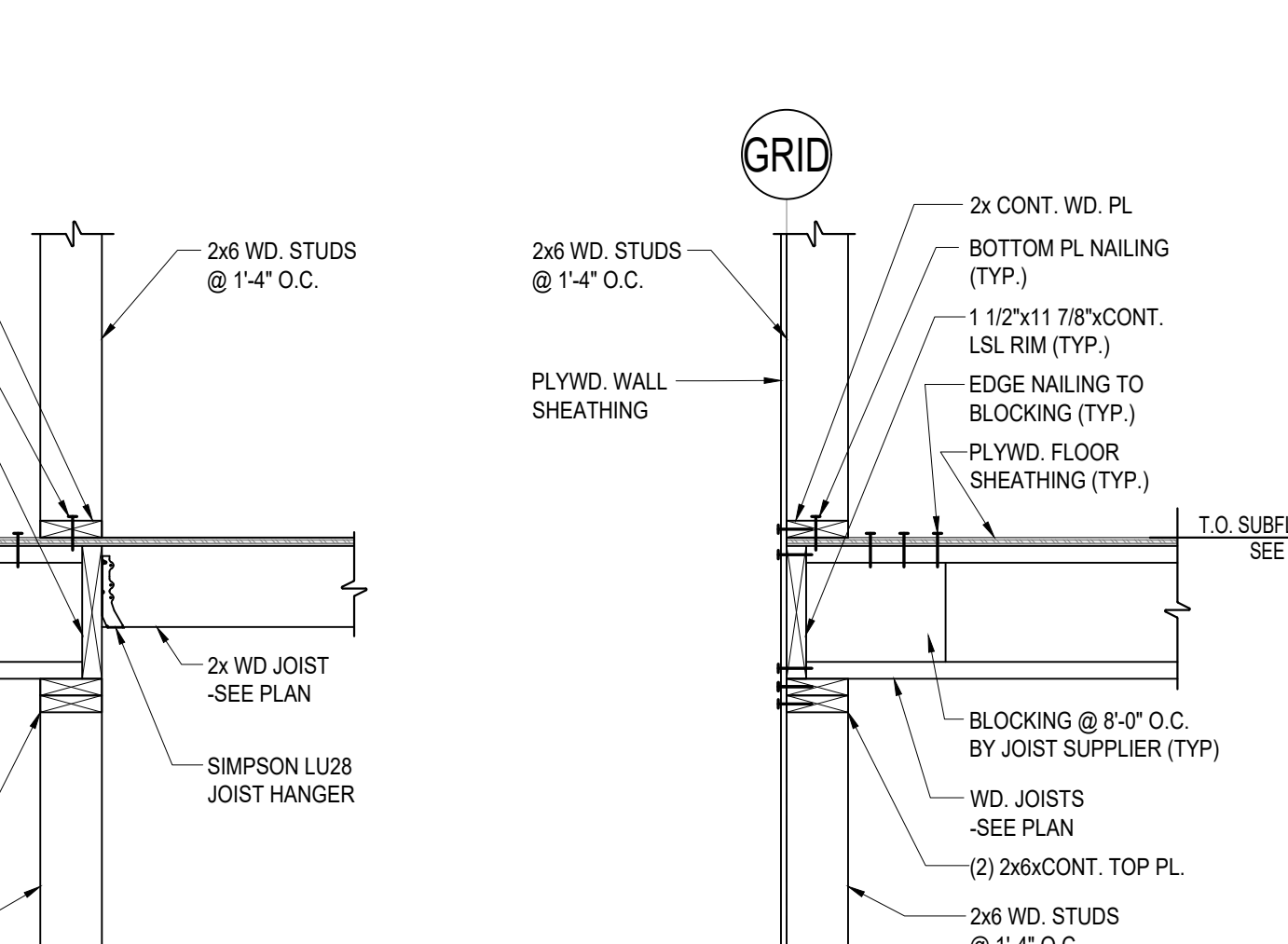
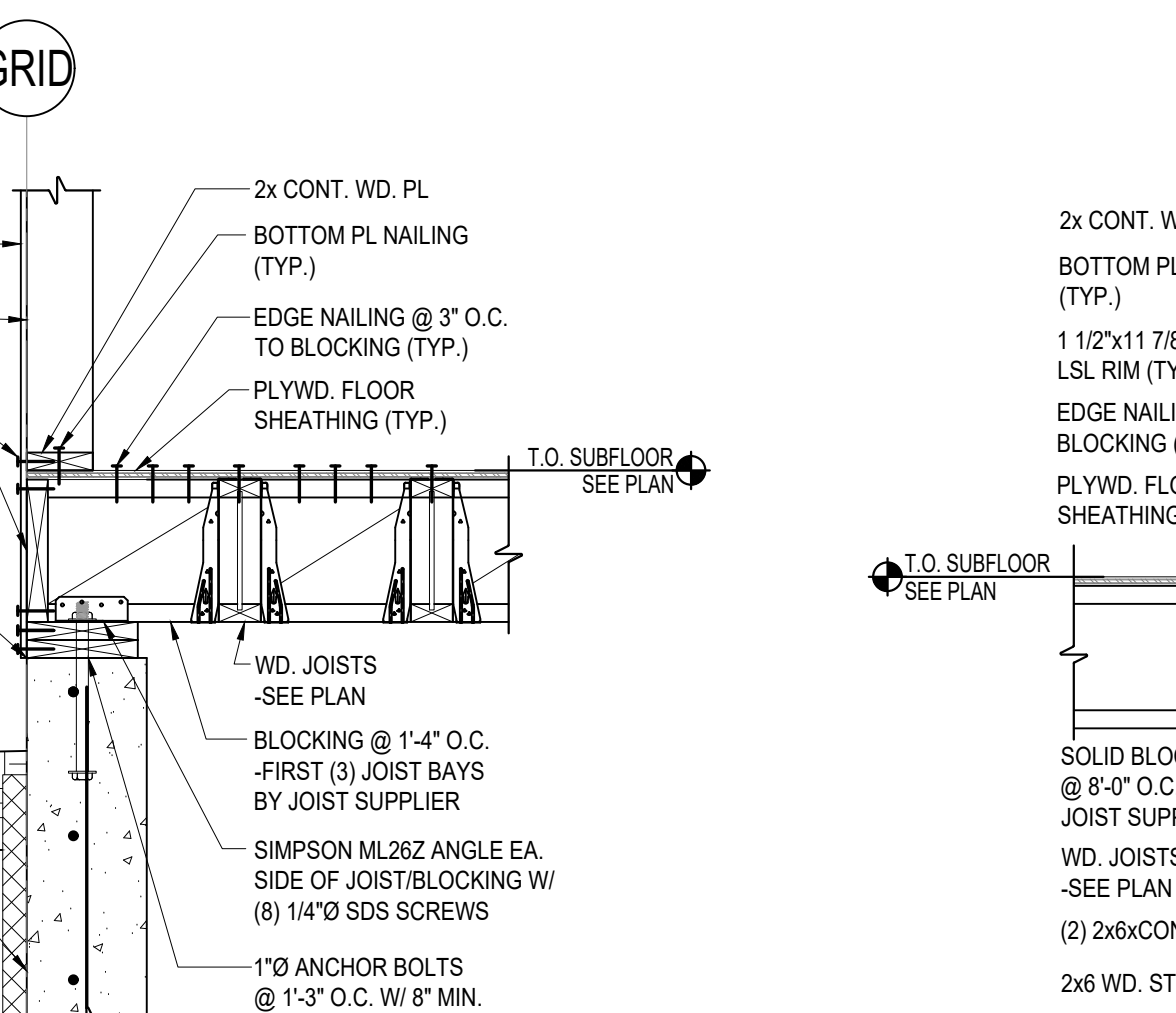
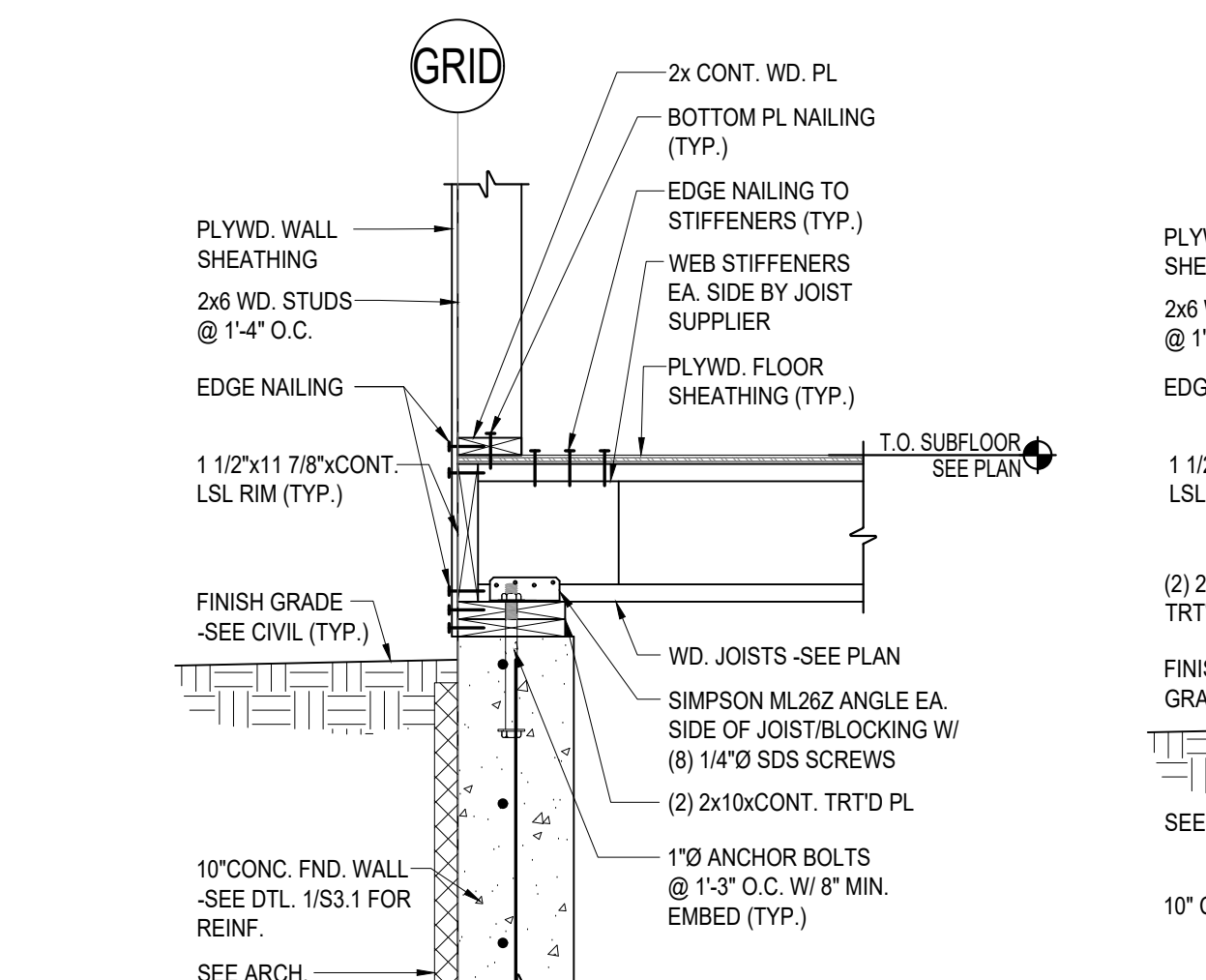
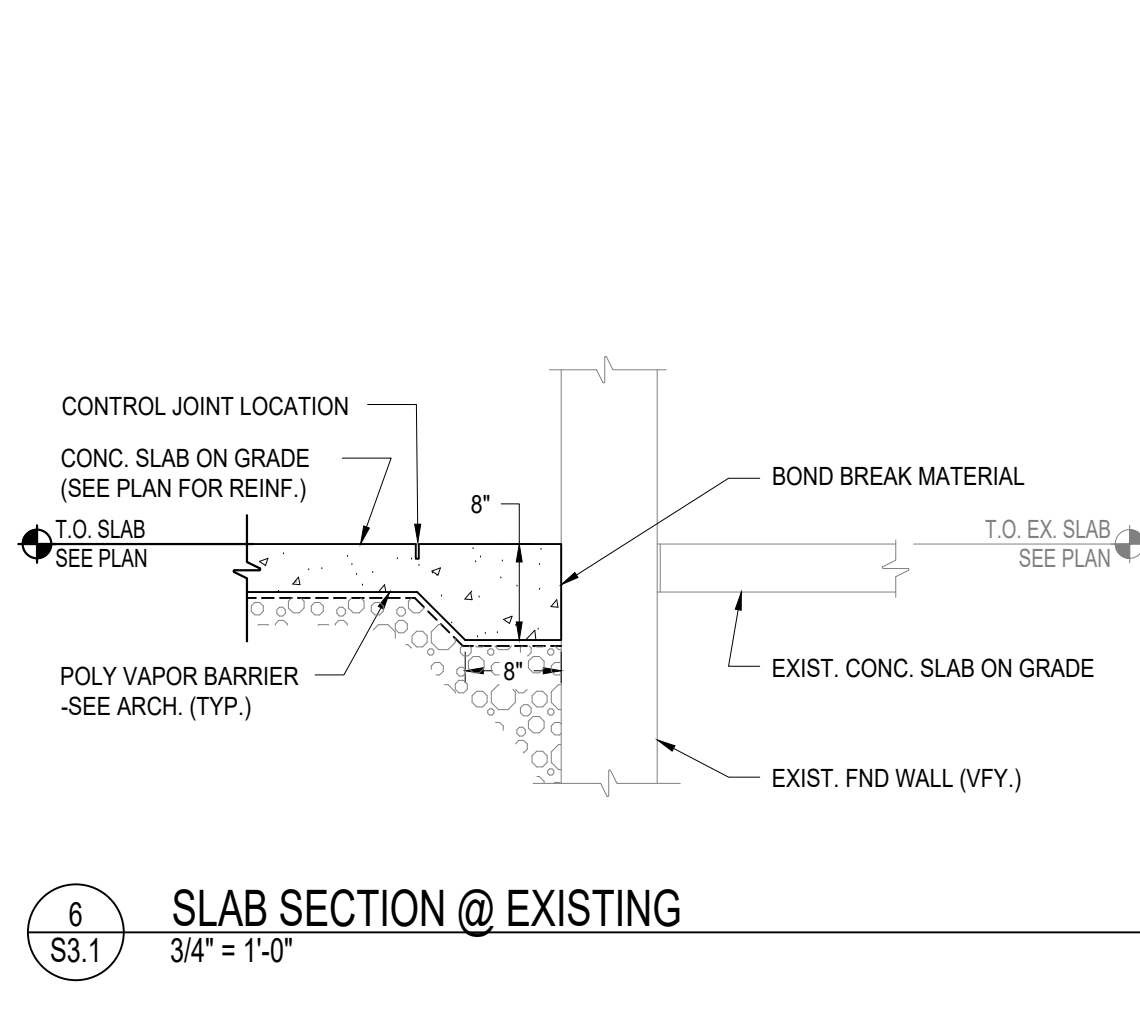
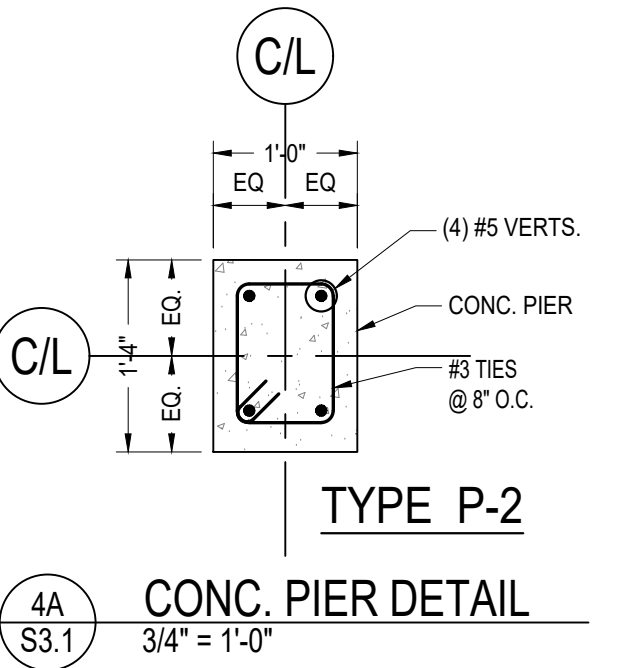
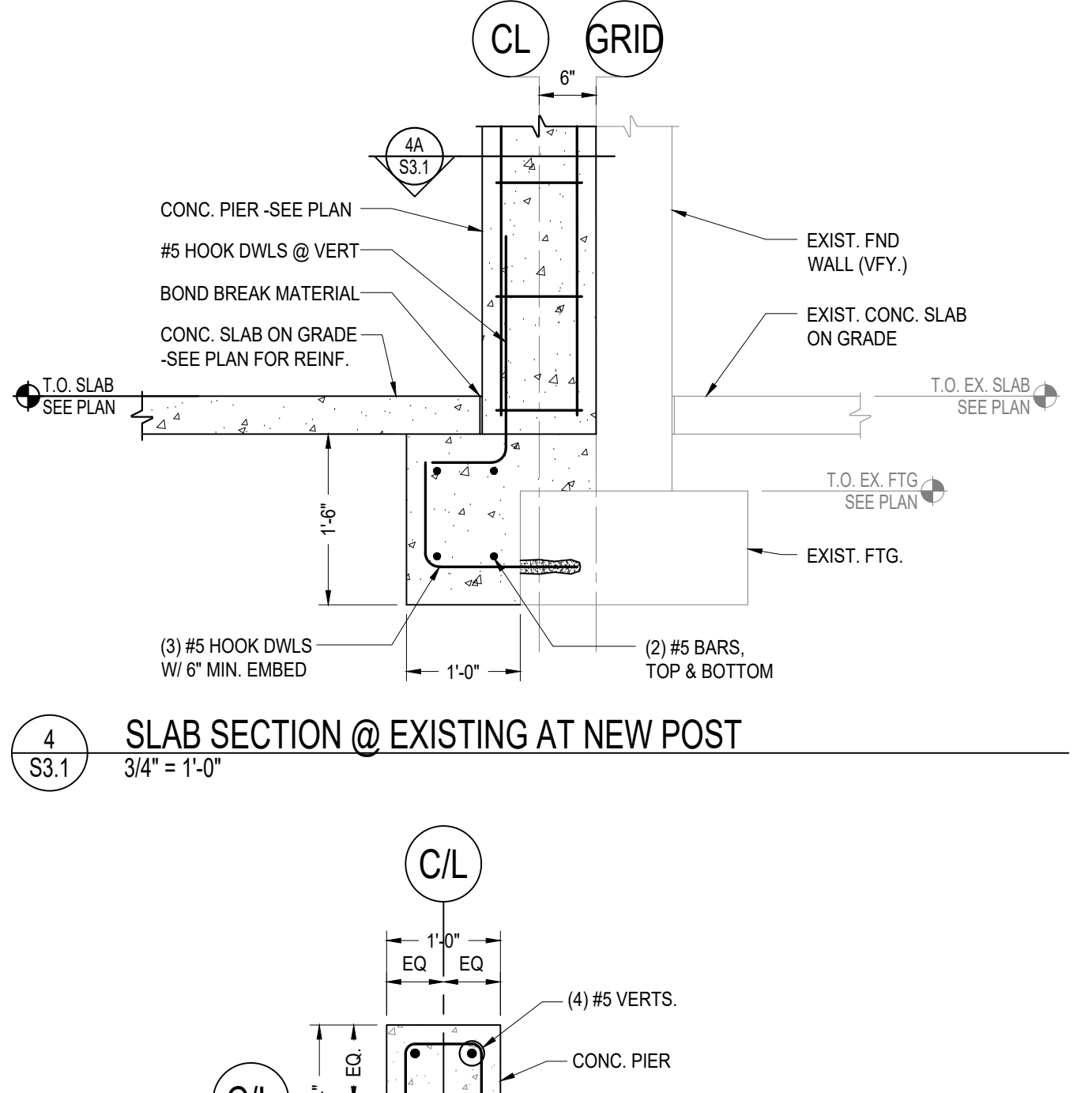
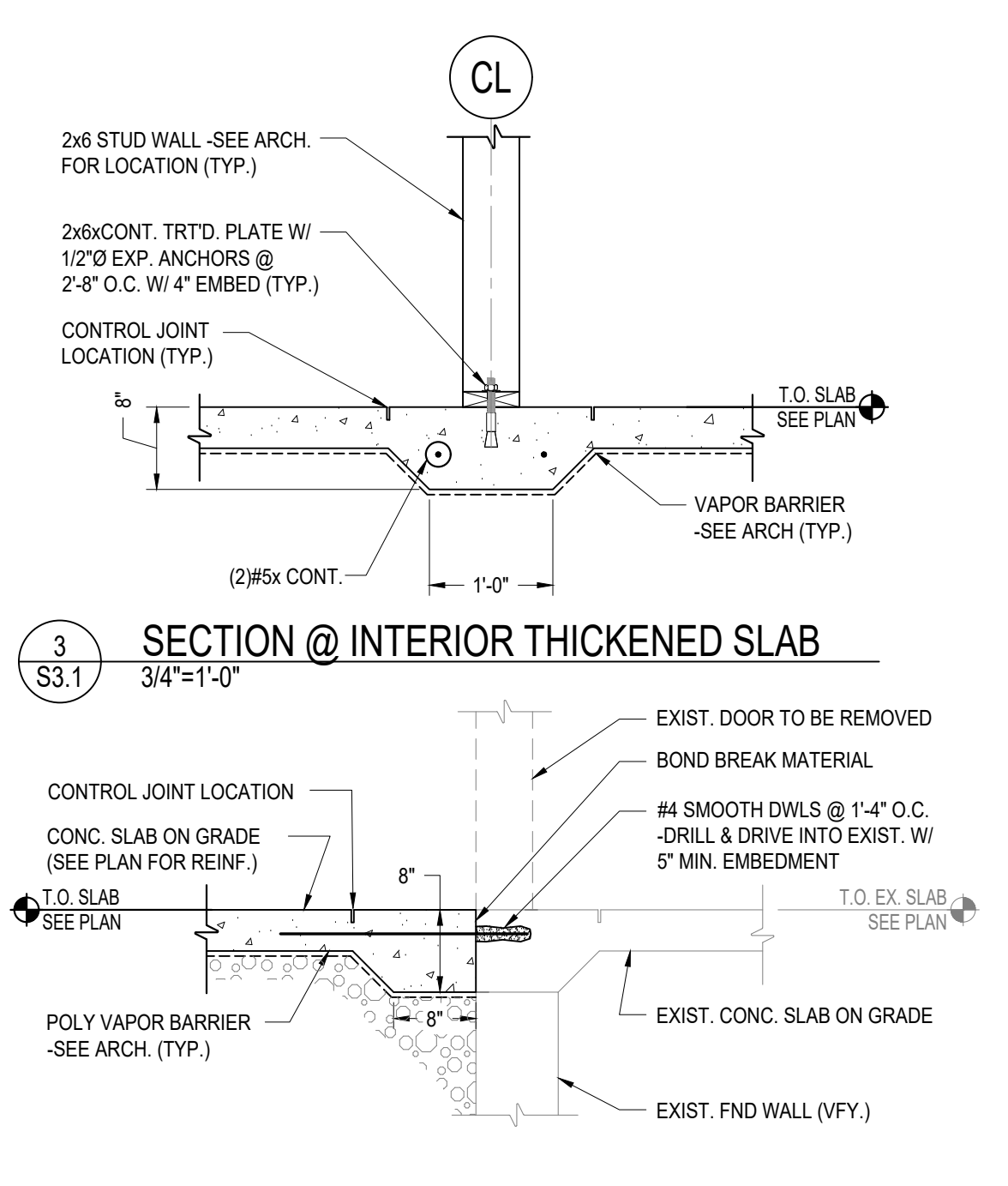
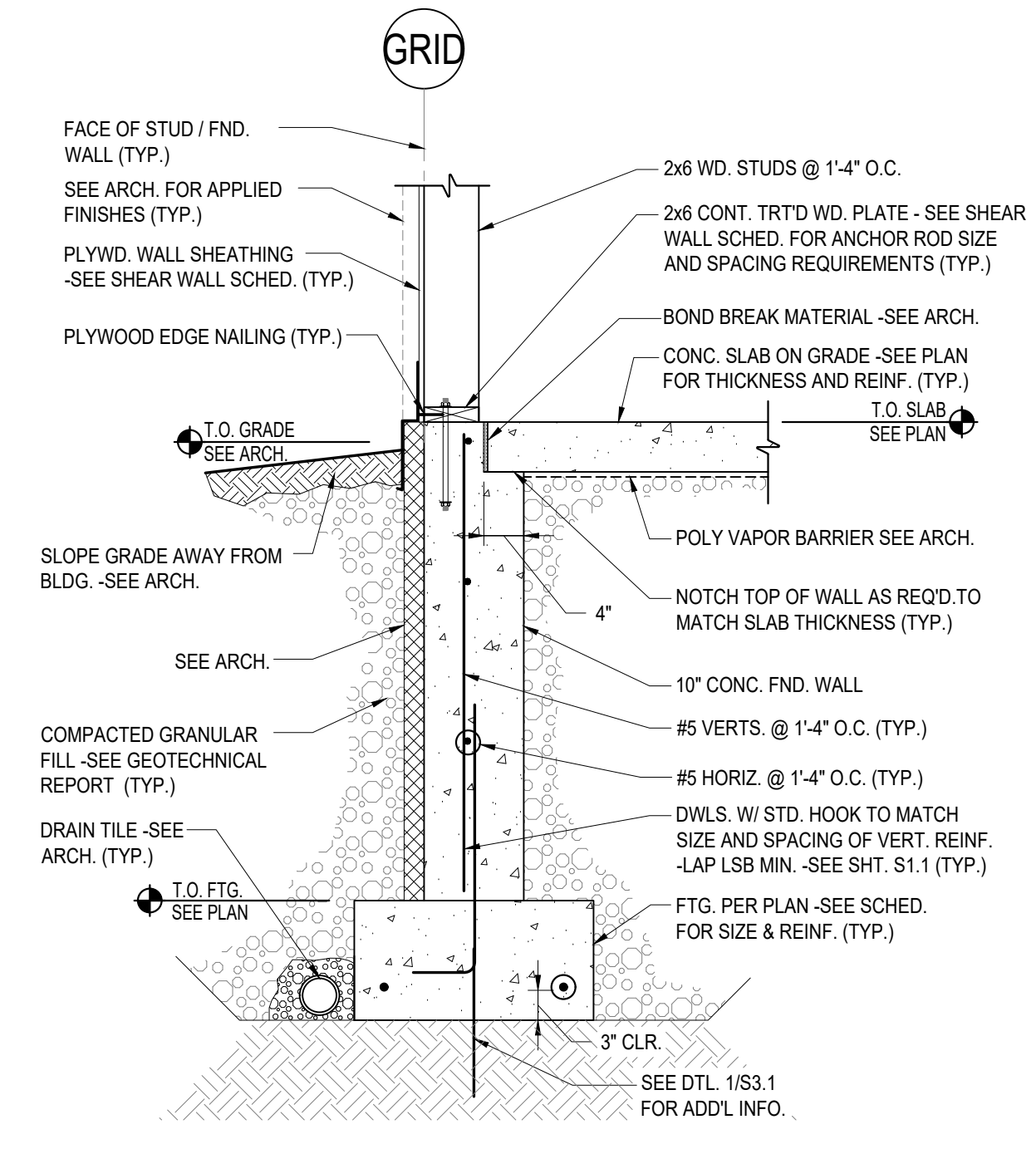
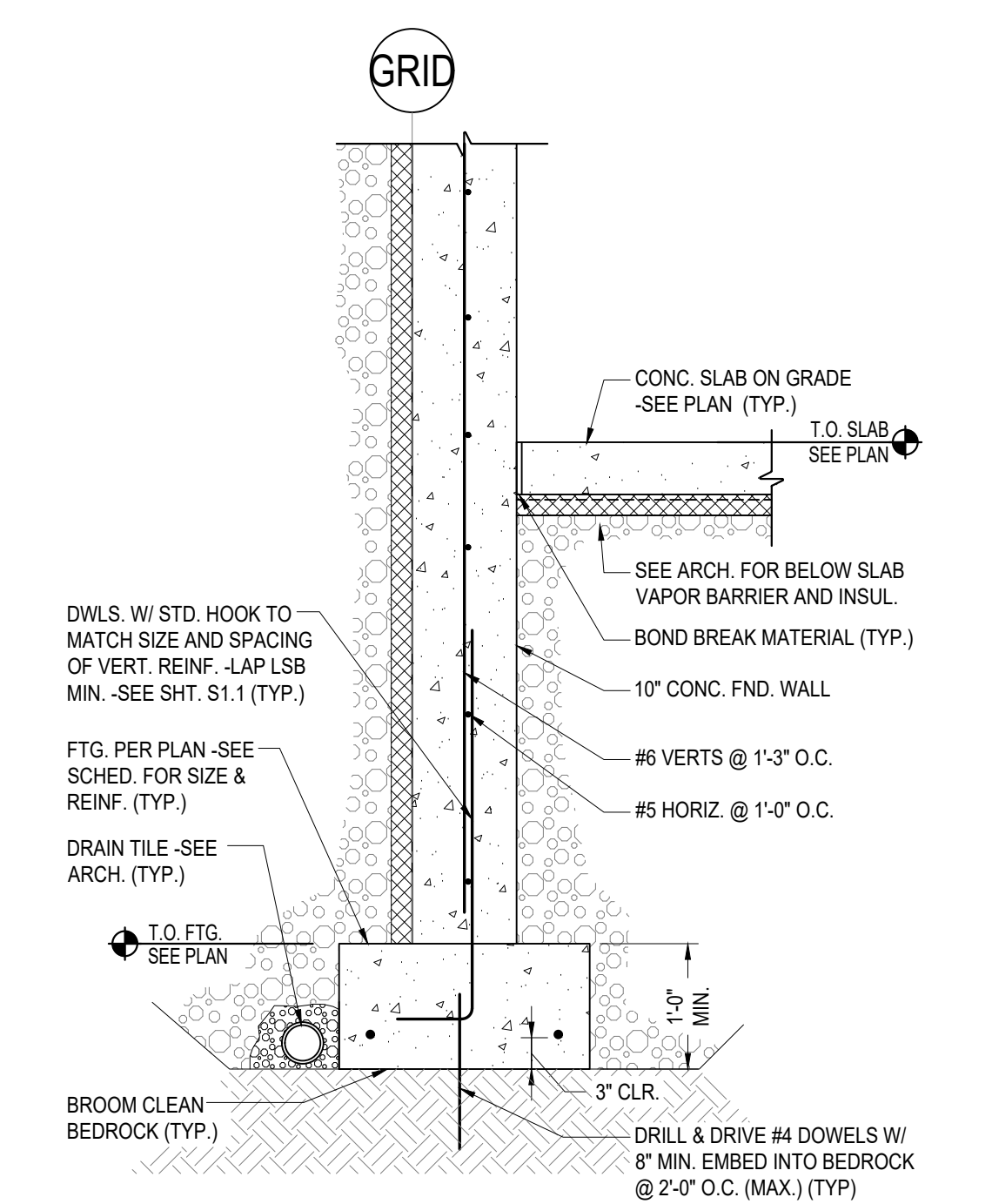
Duluth, MN 55812

project #: 21-368  
date: 09/24/2021  
drawn by: CAJ / HMM  
checked by: MRU

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

signature: *Mark R. Udd*  
printed name: MARK R. UDD  
reg. #: 40443  
sign date: 09/24/2021

revision / issue	no.	date



11 S3.1 3/4" = 1'-0"

12 S3.1 3/4" = 1'-0"

13 S3.1 3/4" = 1'-0"

13 S3.1 3/4" = 1'-0"

























































## GENERAL EXTERIOR NOTES

### \*EXTERIOR NOTES:

-SIDING AT NEW BEDROOM ADDITION TO MATCH OR BE SIMILAR TO EXISTING METAL SIDING.

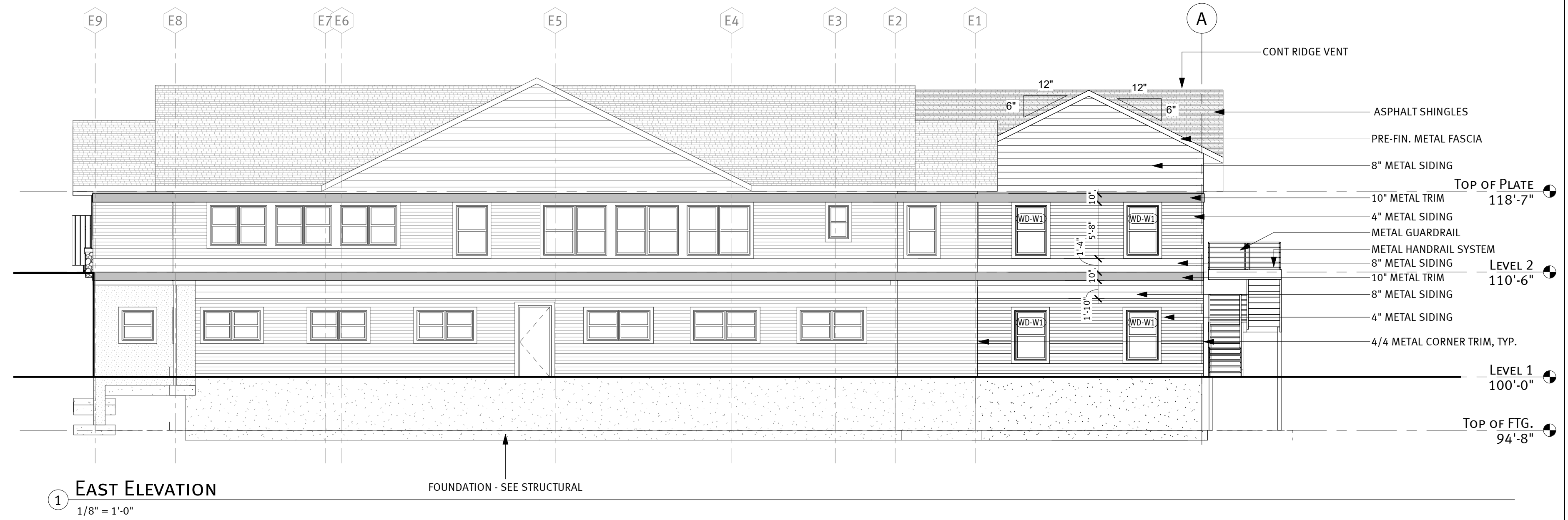
-TRIM AND OTHER ACCESSORIES TO BE SIMILAR/MATCH EXISTING METAL TRIM AT BOTH WALL AND ROOF CONDITIONS.

-TRIM TO BE PROVIDED AT ALL CORNER CONDITIONS AND MATERIAL TRANSITIONS. TRIM TO BE PROVIDED AT ANY NEW TO EXISTING CONDITIONS.

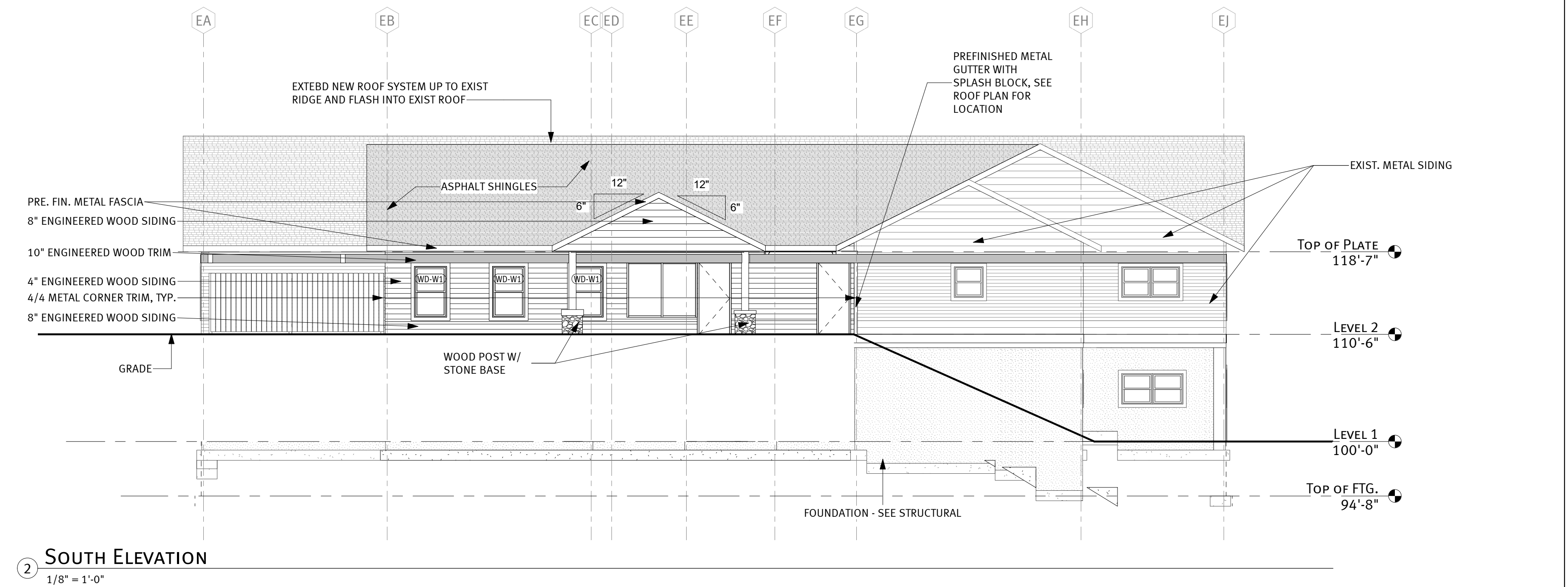
-WINDOWS TO MATCH IN STYLE AND SIZE OF EXISTING WINDOWS.

-ROOF SHINGLES SHALL MATCH EXISTING SHINGLES IN COLOR AND SIZE. PATCH AS REQUIRED AT NEW TO EXISTING ROOF CONDITIONS.

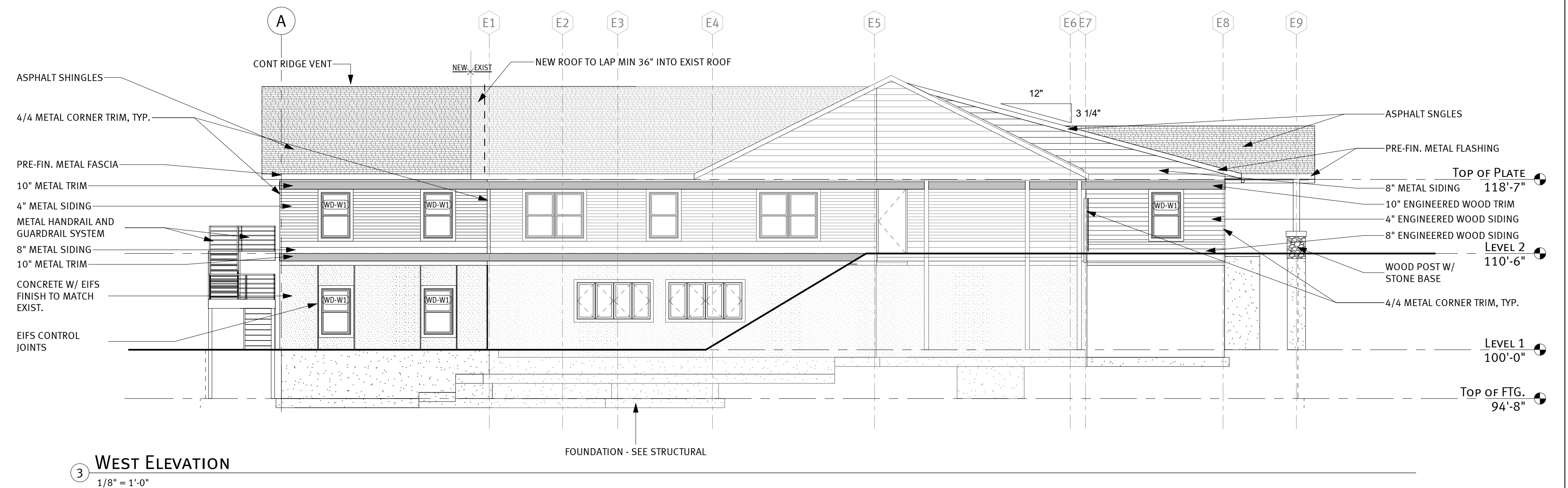
\*\*SIDING & TRIM TO MATCH EXISTING PATTERN AND COLORS BELOW



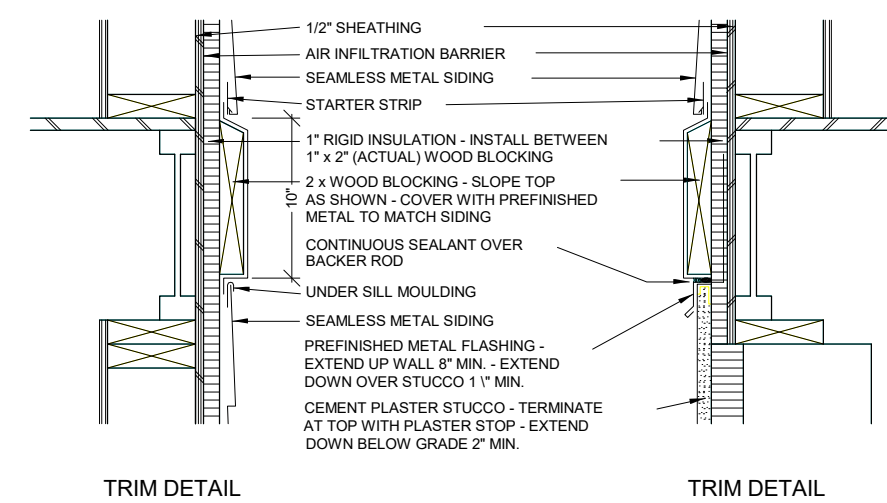
1 EAST ELEVATION  
1/8" = 1'-0"



2 SOUTH ELEVATION  
1/8" = 1'-0"

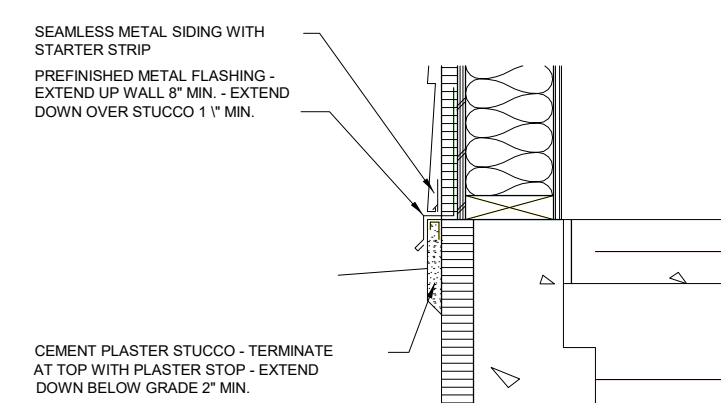


3 WEST ELEVATION  
1/8" = 1'-0"



TRIM DETAIL

TRIM DETAIL



4 TRIM DETAILS  
1" = 1'-0"

## SAFE HAVEN WOMEN'S SHELTER

P.O. Box 3558  
DULUTH, MN 55803

project #: 020115.00

date: 9/30/2021 4:37:36 PM

drawn by: VP/KMG

checked by: KMG

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the state of Minnesota.

signature: *John E. Erickson*  
printed name: JOHN E. ERICKSON, NCARB, LEED AP  
reg. #: 24199  
sign date: 9.24.21

revision / issue	no.	date

EXTERIOR ELEVATIONS

sheet number: **A5.1**

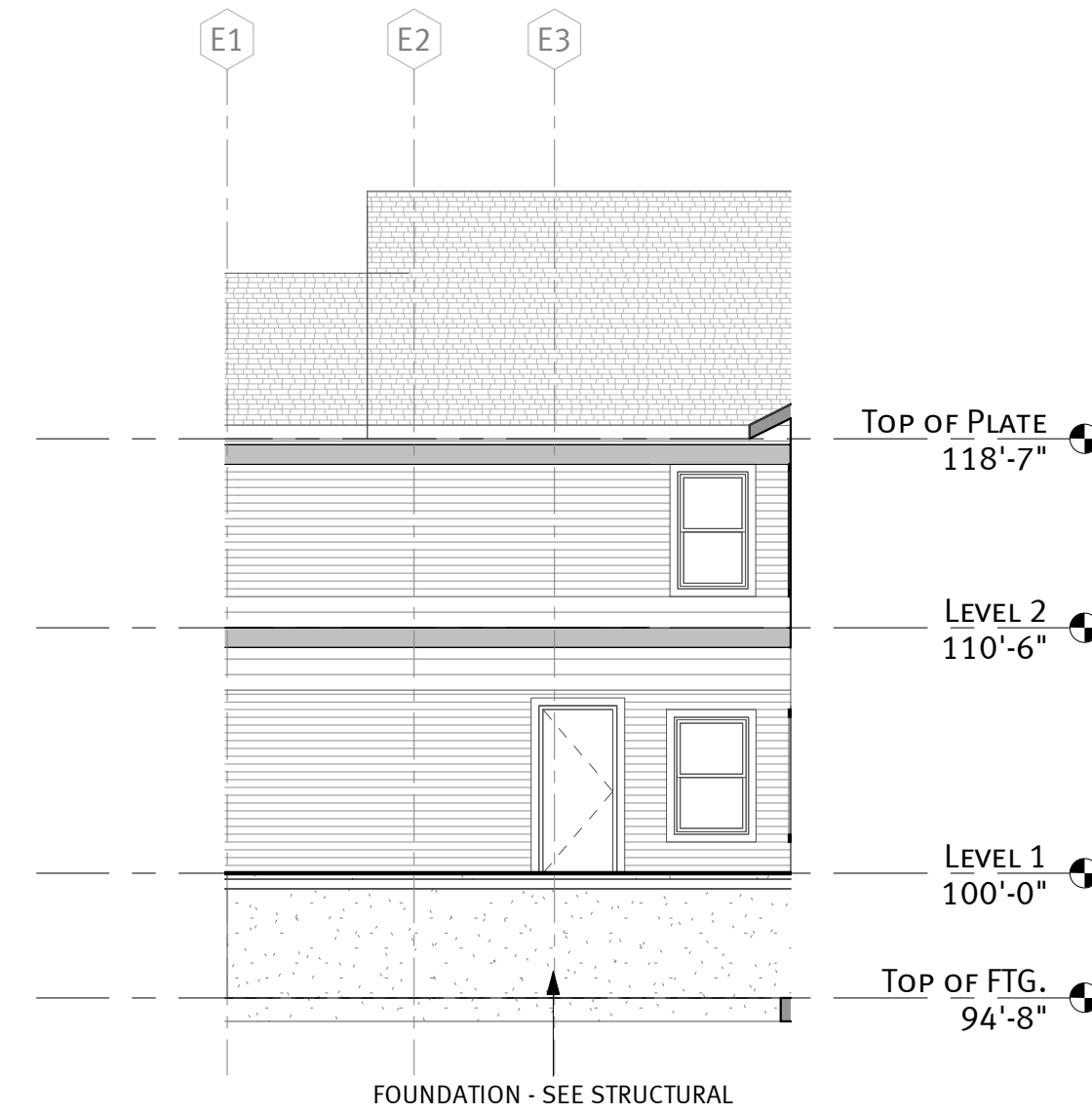


# GENERAL EXTERIOR NOTES

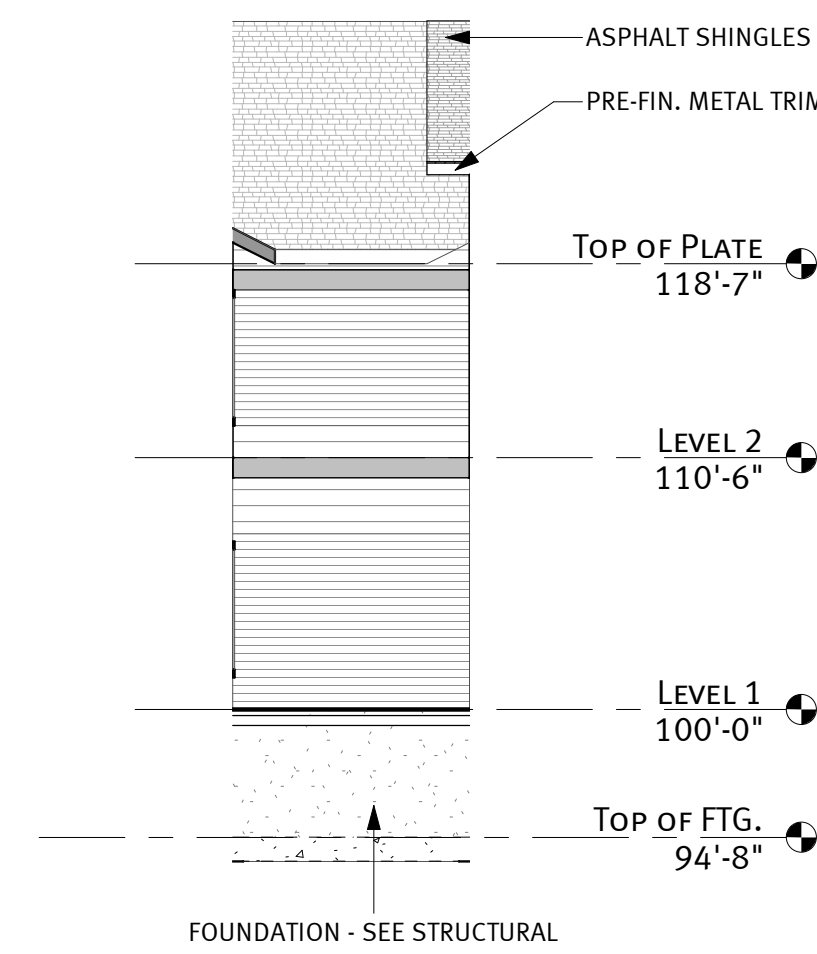
**\*EXTERIOR NOTES:**

- SIDING AT NEW BEDROOM ADDITION TO MATCH OR BE SIMILAR TO EXISTING METAL SIDING.
- TRIM AND OTHER ACCESSORIES TO BE SIMILAR/MATCH EXISTING METAL TRIM AT BOTH WALL AND ROOF CONDITIONS.
- TRIM TO BE PROVIDED AT ALL CORNER CONDITIONS AND MATERIAL TRANSITIONS. TRIM TO BE PROVIDED AT ANY NEW TO EXISTING CONDITIONS.
- WINDOWS TO MATCH IN STYLE AND SIZE OF EXISTING WINDOWS.
- ROOF SHINGLES SHALL MATCH EXISTING SHINGLES IN COLOR AND SIZE. PATCH AS REQUIRED AT NEW TO EXISTING ROOF CONDITIONS.

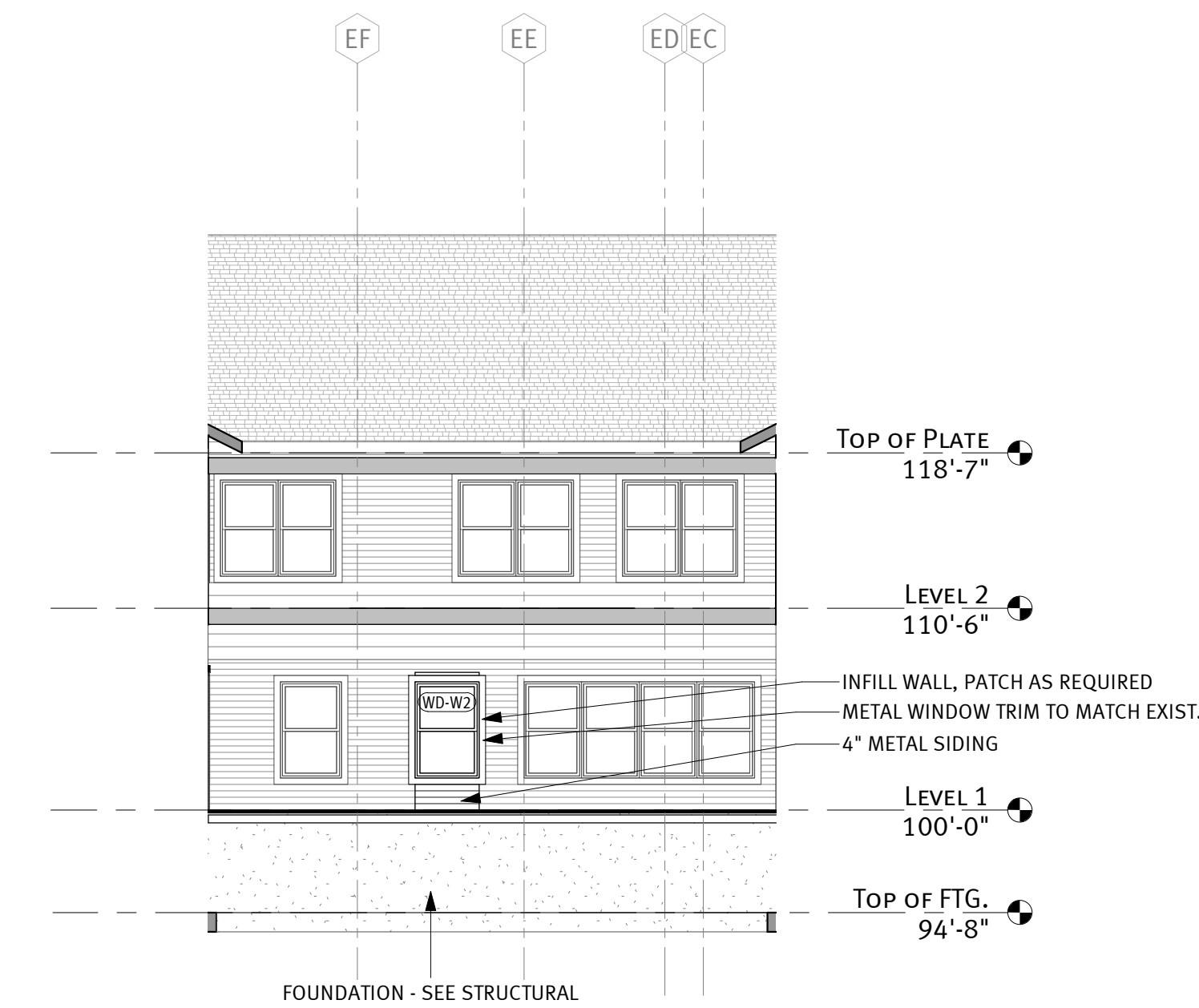
\*\*SIDING & TRIM TO MATCH EXISTING PATTERN AND COLORS BELOW



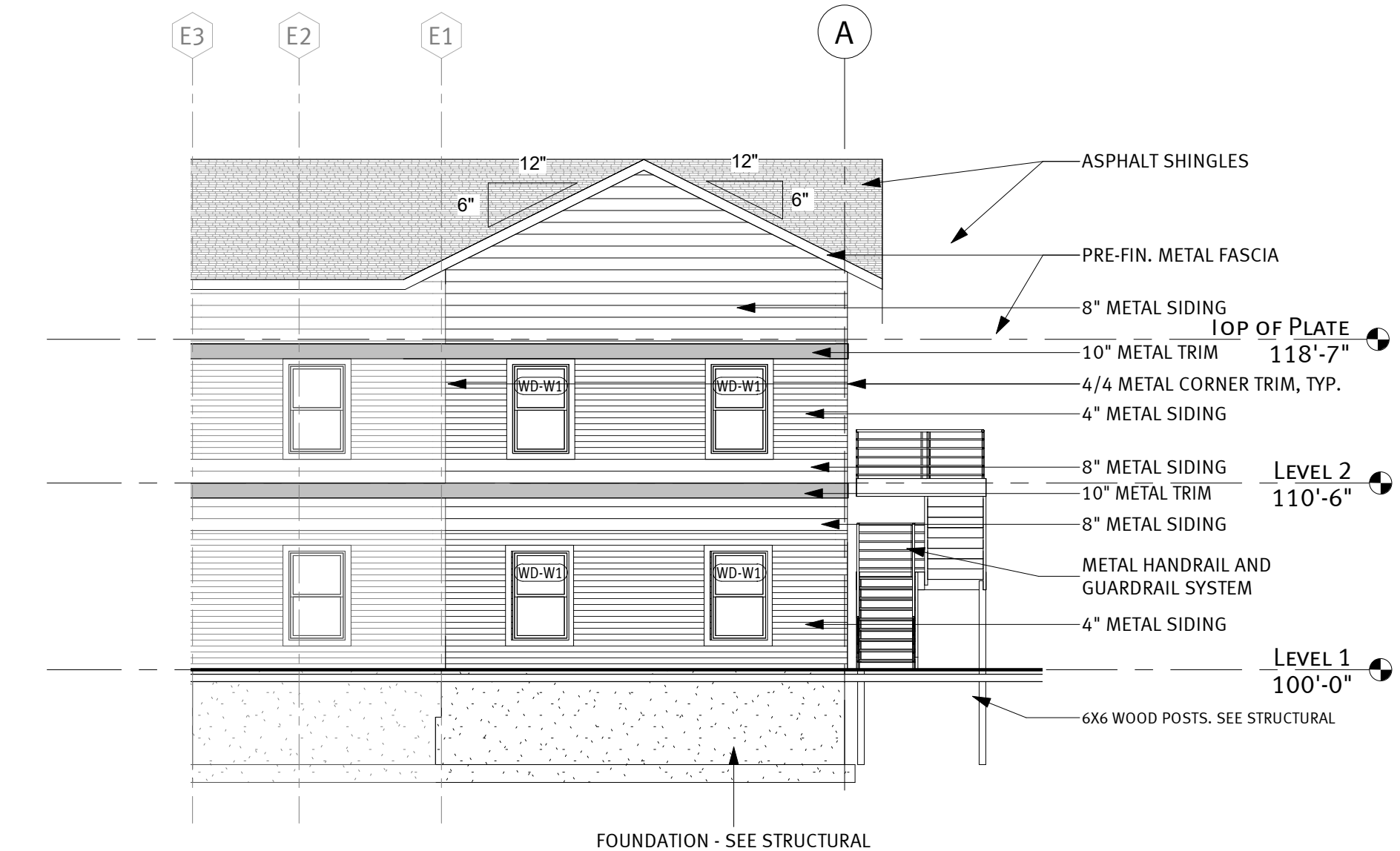
① SOUTH COURTYARD ELEVATION - EXIST ELEV. NO CHANGE  
1/8" = 1'-0"



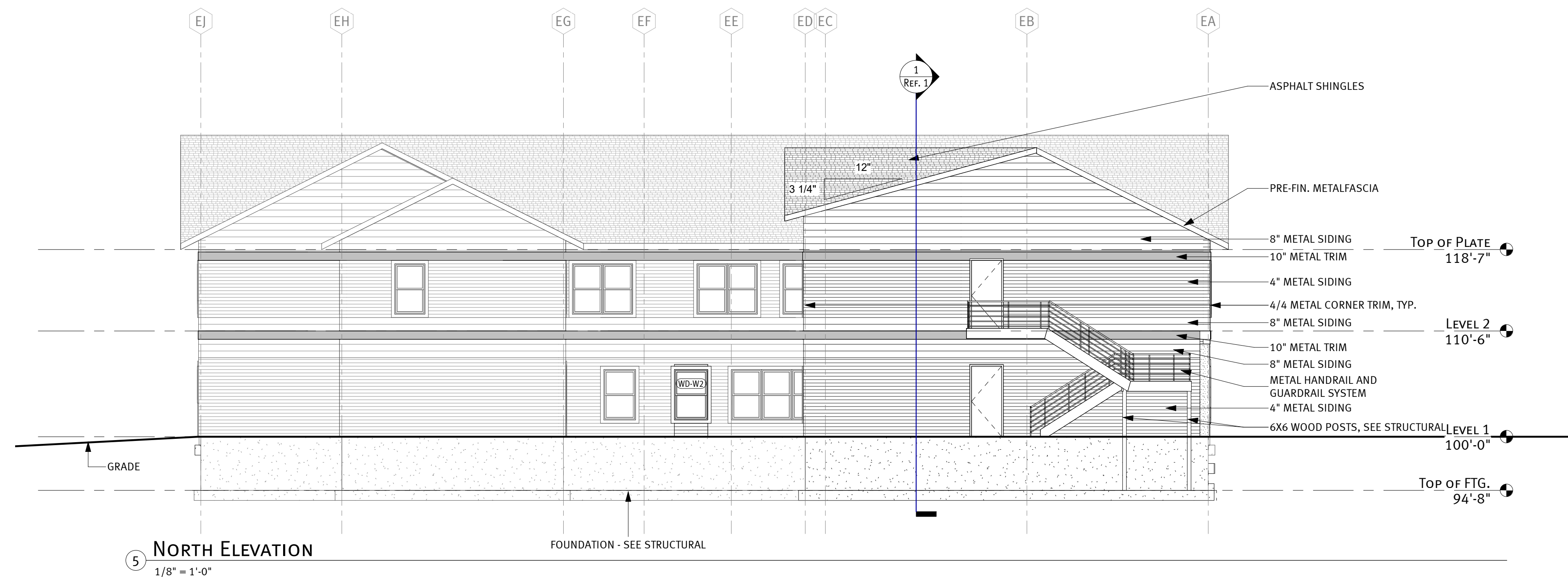
③ NORTH COURTYARD ELEVATION - EXIST ELEV. NO CHANGE  
1/8" = 1'-0"



② WEST COURTYARD ELEVATION  
1/8" = 1'-0"



④ NORTH ELEVATION NEAR COURTYARD  
1/8" = 1'-0"



⑤ NORTH ELEVATION  
1/8" = 1'-0"



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## SAFE HAVEN WOMEN'S SHELTER

P.O. Box 3558  
DULUTH, MN 55803

project #: 020115.00

date: 9/30/2021 4:37:39 PM

drawn by: VP/KMG

checked by: KMG

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the state of Minnesota.

signature: *John E. Erickson*

printed name: JOHN E. ERICKSON, NCARB, LEED AP

reg. #: 24199

sign date: 9.24.21

revision / issue	no.	date

EXTERIOR  
ELEVATIONS

sheet number: A5.2



















# SAFE HAVEN WOMEN'S SHELTER

DULUTH, MN 55812

project #: R21-4133.000

date: 9/24/2021 1:13:07 PM

drawn by: SLN

checked by: KJD

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signature: *Kalysta Davis*  
printed name: KALYSTA DAVIS  
reg. #: 54916  
sign date: 09/24/2021

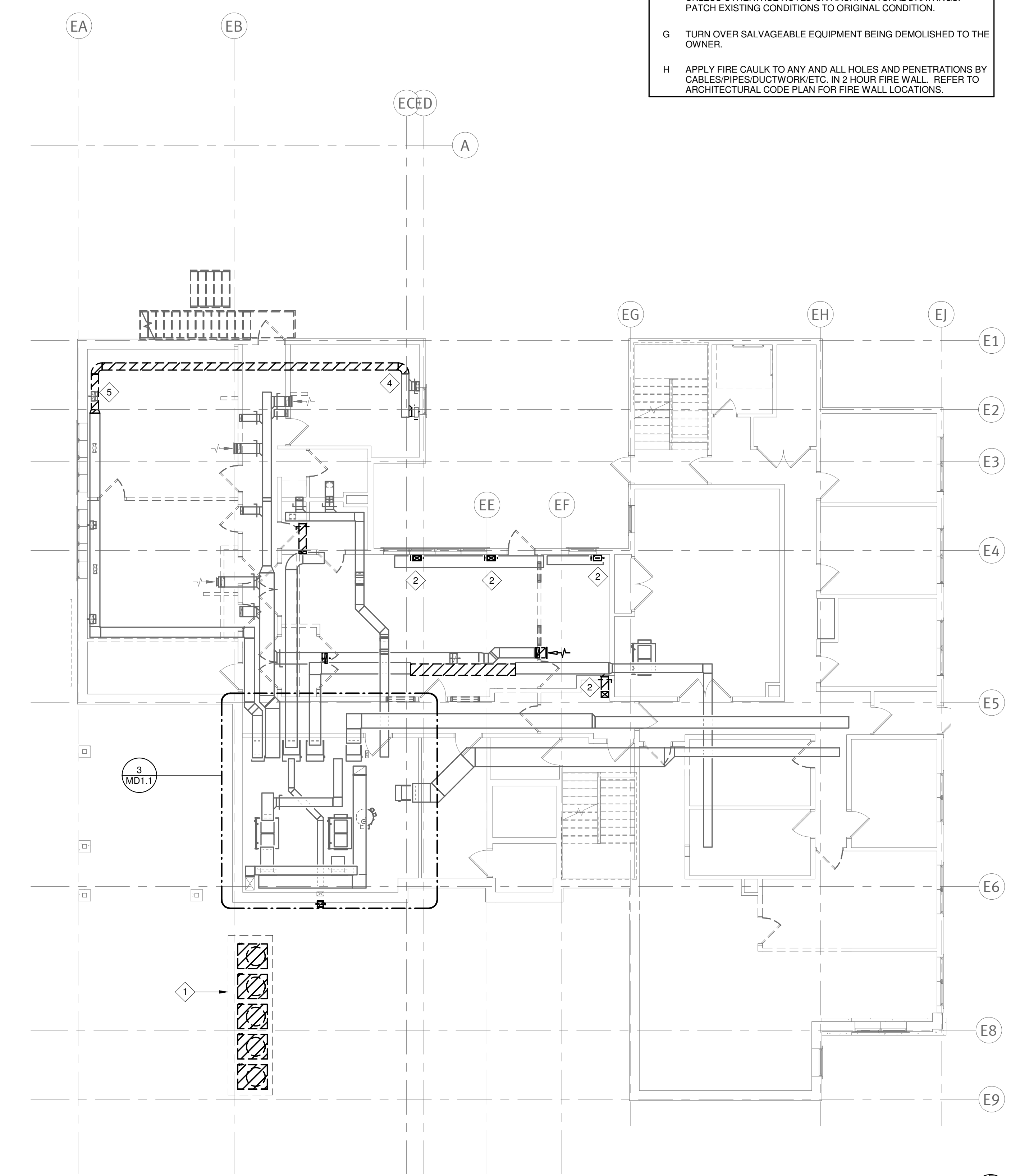
revision / issue	no.	date

MECHANICAL  
DEMOLITION  
PLAN

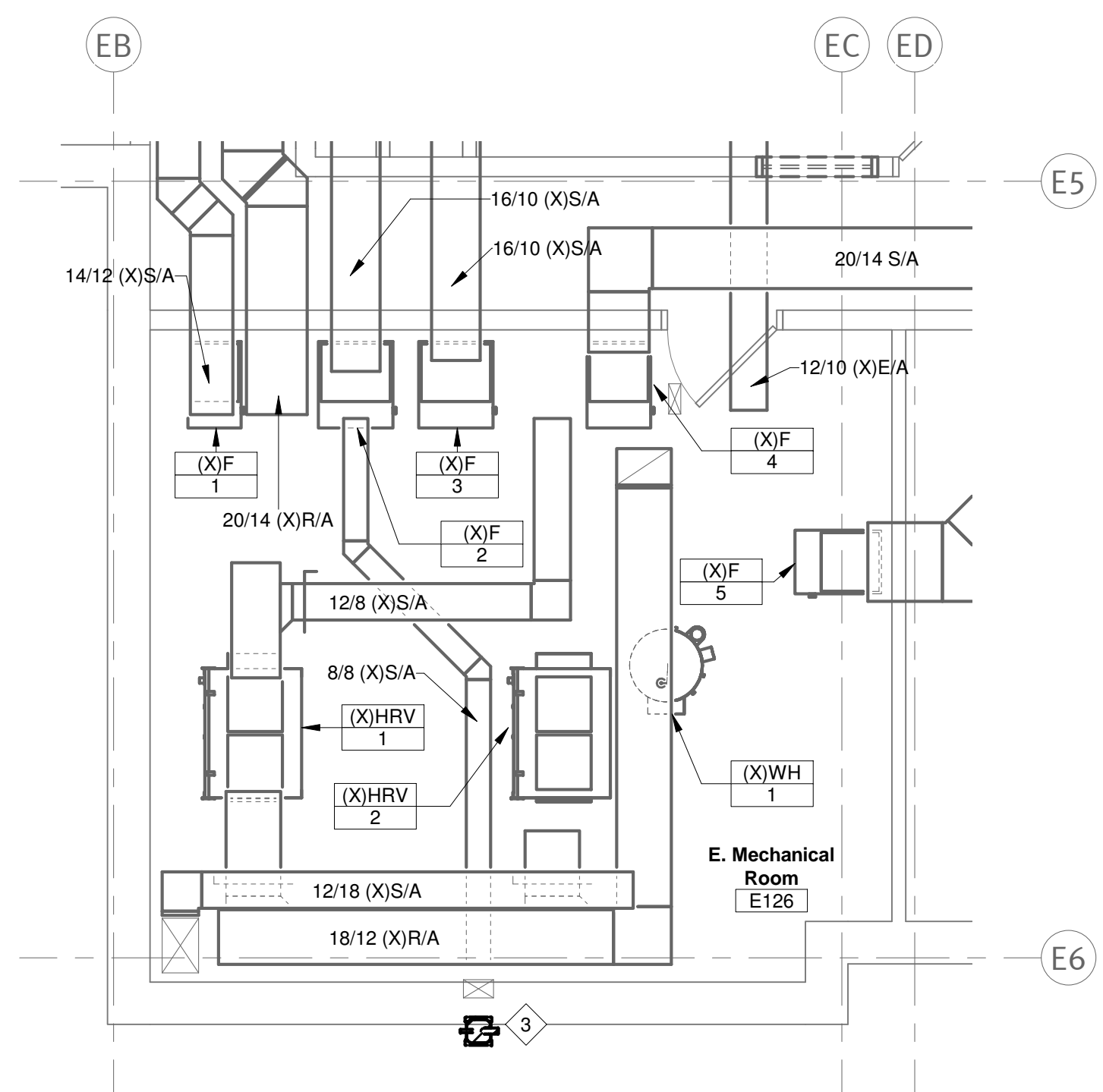
sheet title: **MD1.1**

- ### GENERAL NOTES - DEMOLITION
- A FIELD VERIFY ALL EXISTING CONDITIONS, PIPING, DUCT LOCATIONS, SIZES, ETC.
  - B REMOVE AND REINSTALL ALL EXISTING CEILING SYSTEMS REQUIRED FOR DEMOLITION AND INSTALLATION OF NEW PIPING, DUCTWORK, CONTROLS, ETC. UNLESS NOTED OTHERWISE ON ARCHITECTURAL DRAWING.
  - C REMOVE ALL ABANDONED HANGERS, TRAPS, INSULATION, PIPING ACCESSORIES, ETC.
  - D THIS CONTRACTOR TO PATCH WALL(S) WITH SIMILAR CONSTRUCTION MATERIAL FOR ALL OPENINGS CREATED BY THE REMOVAL OF EXISTING ITEMS SUCH AS DUCTWORK, PIPING, TUBING, ETC. UNLESS NOTED OTHERWISE.
  - E PROVIDE FIRESTOPPING FOR ALL OPENINGS CREATED FROM THE REMOVAL OF EXISTING ITEMS SUCH AS DUCTWORK, PIPING, TUBING, ETC.
  - F ALL SAWCUTTING AND PATCHING OF EXISTING FLOORS, CUTTING AND PATCHING OF EXISTING WALLS AND CEILINGS REQUIRED TO ACCESS EXISTING PIPING, DUCTWORK, ETC. FOR REMODELING WORK SHOWN WILL BE THE RESPONSIBILITY OF THIS CONTRACTOR UNLESS OTHERWISE NOTED ON ARCHITECTURAL DRAWINGS. PATCH EXISTING CONDITIONS TO ORIGINAL CONDITION.
  - G TURN OVER SALVAGEABLE EQUIPMENT BEING DEMOLISHED TO THE OWNER.
  - H APPLY FIRE CAULK TO ANY AND ALL HOLES AND PENETRATIONS BY CABLES/PIPES/DUCTWORK/ETC. IN 2 HOUR FIRE WALL. REFER TO ARCHITECTURAL CODE PLAN FOR FIRE WALL LOCATIONS.

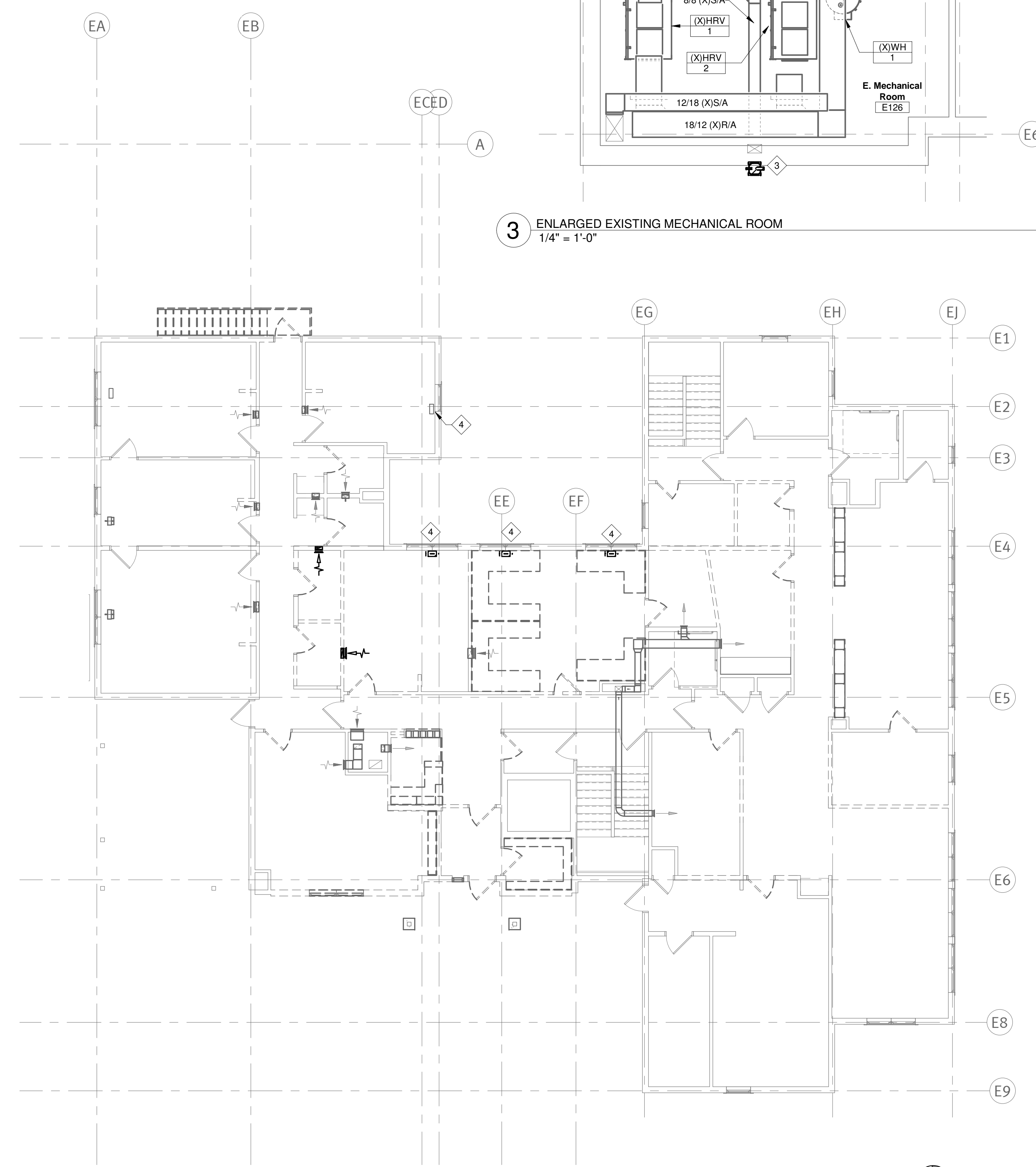
- ### KEYNOTES
- 1 EXISTING AIR COOLED CONDENSING UNITS TO BE RELOCATED.
  - 2 DISCONNECT DUCTWORK AS SHOWN AND PREPARE FOR CONNECTION TO NEW DUCTWORK TO SEPERATE THERMAL ZONES.
  - 3 EXISTING GAS METER TO BE RELOCATED ON NORTH WALL OF NEW ADDITION.
  - 4 DISCONNECT DUCTWORK AS SHOWN AND PREPARE FOR RECONNECTION TO F2 FOR LEVEL 1 AND F3 FOR LEVEL 2 SPACES.
  - 5 PREPARE F1 DUCT RUN TO BE EXTENDED TO SERVE NEW ADDITION BEDROOMS.



**1** LEVEL 1 OVERALL HVAC DEMOLITION PLAN  
1/8" = 1'-0"



**3** ENLARGED EXISTING MECHANICAL ROOM  
1/4" = 1'-0"



**2** LEVEL 2 OVERALL HVAC DEMOLITION PLAN  
1/8" = 1'-0"

















# SAFE HAVEN WOMEN'S SHELTER

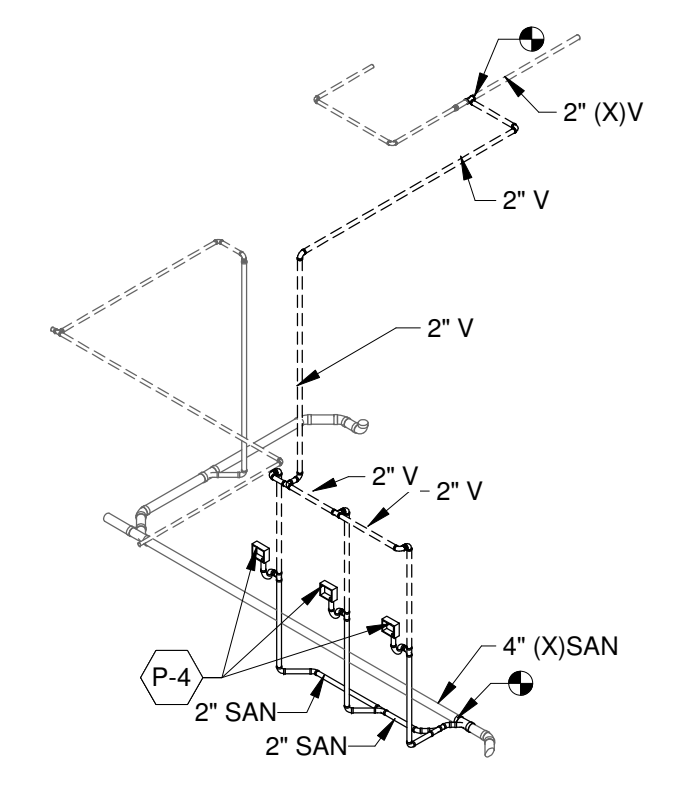
DULUTH, MN 55812

project #: R21-4133.000  
date: 9/24/2021 1:13:04 PM  
drawn by: SLN  
checked by: KJD

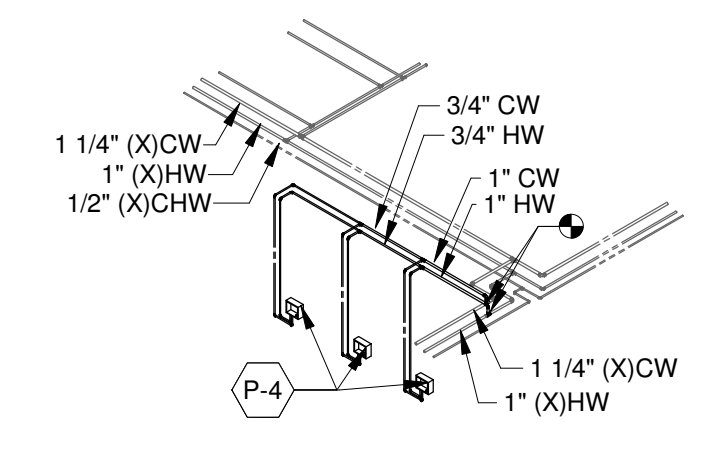
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signature: *Kalysta Davis*  
printed name: KALYSTA DAVIS  
reg. #: 54916  
sign date: 09/24/2021

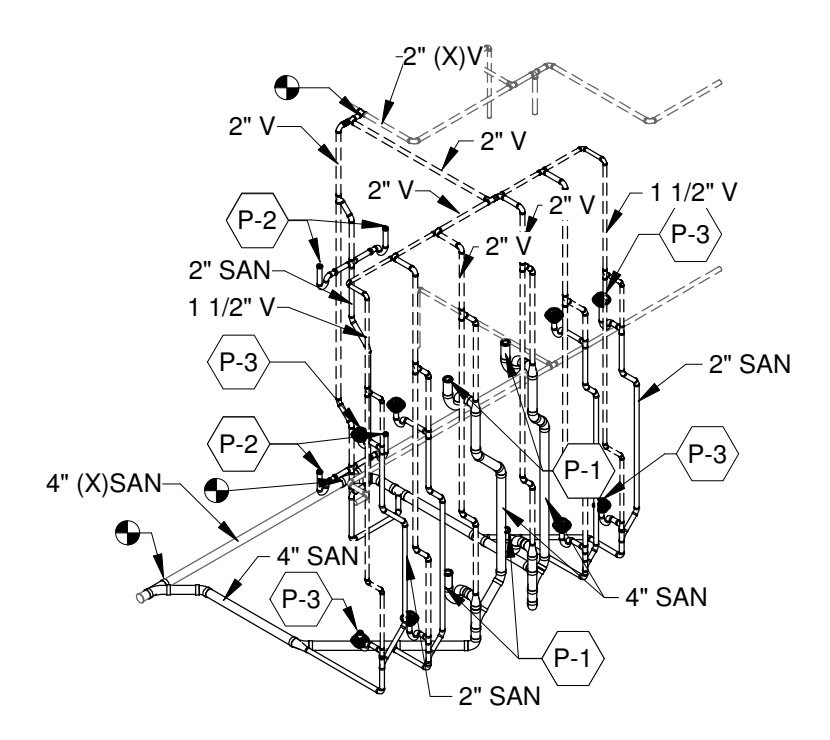
revision / issue	no.	date



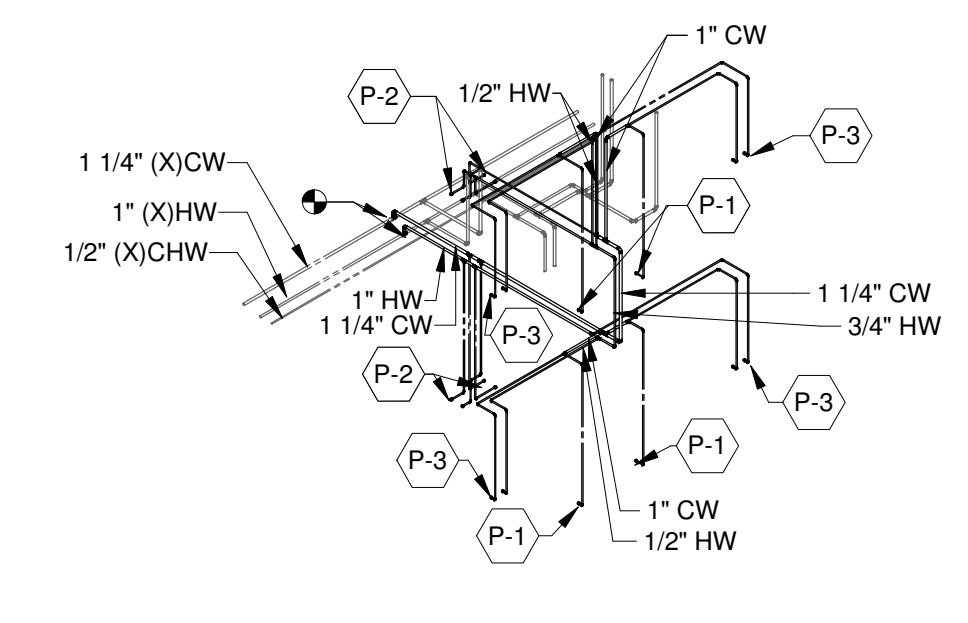
**4** LAUNDRY WASTE & VENT RISER DIAGRAM



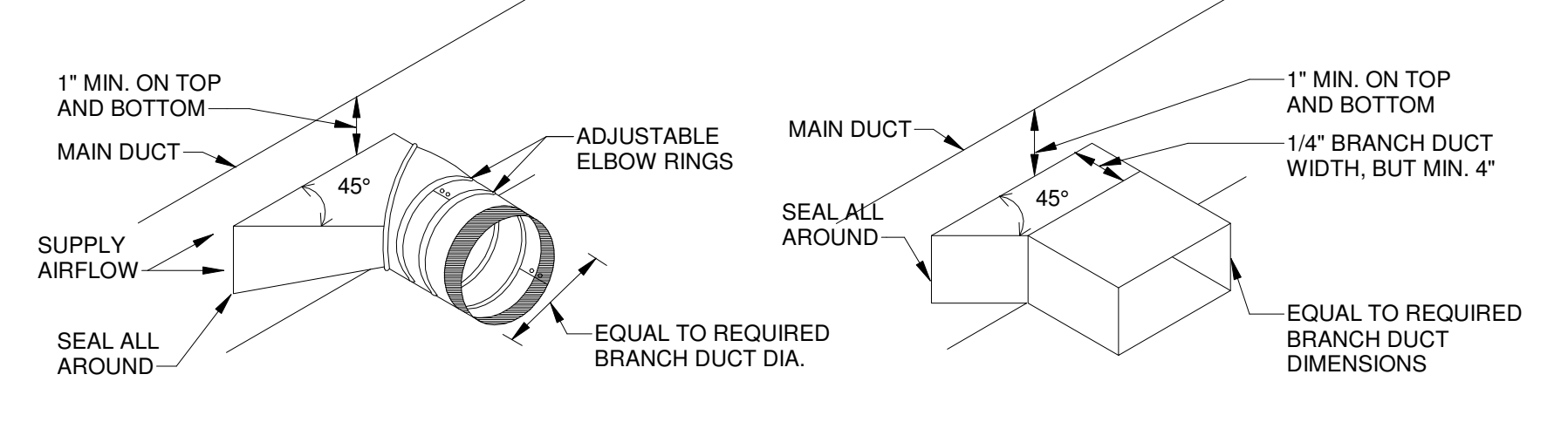
**3** LAUNDRY DOMESTIC WATER RISER DIAGRAM



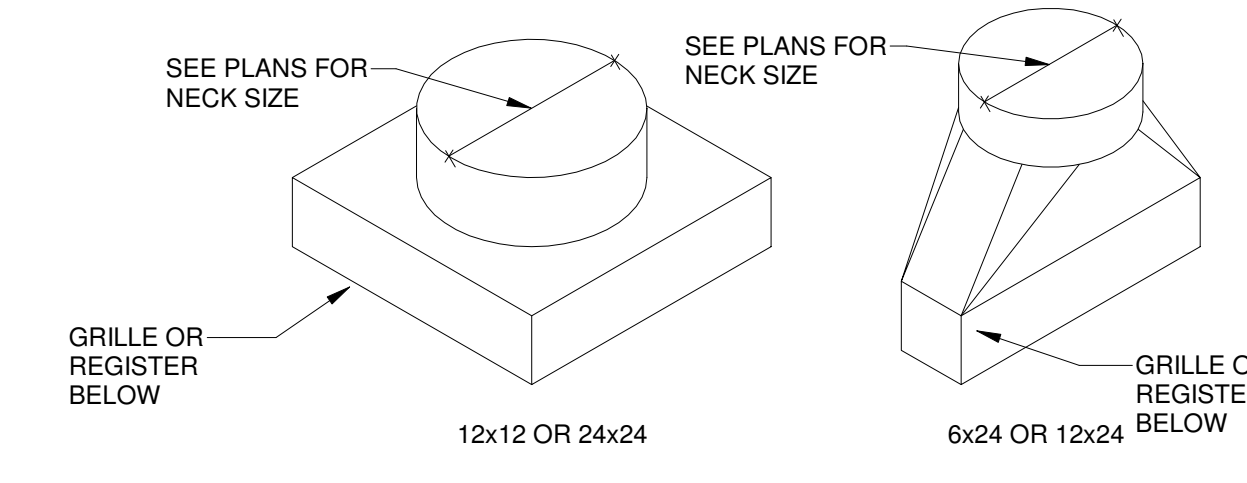
**2** RESTROOM WASTE AND VENT RISER DIAGRAM



**1** RESTROOM DOMESTIC WATER RISER DIAGRAM

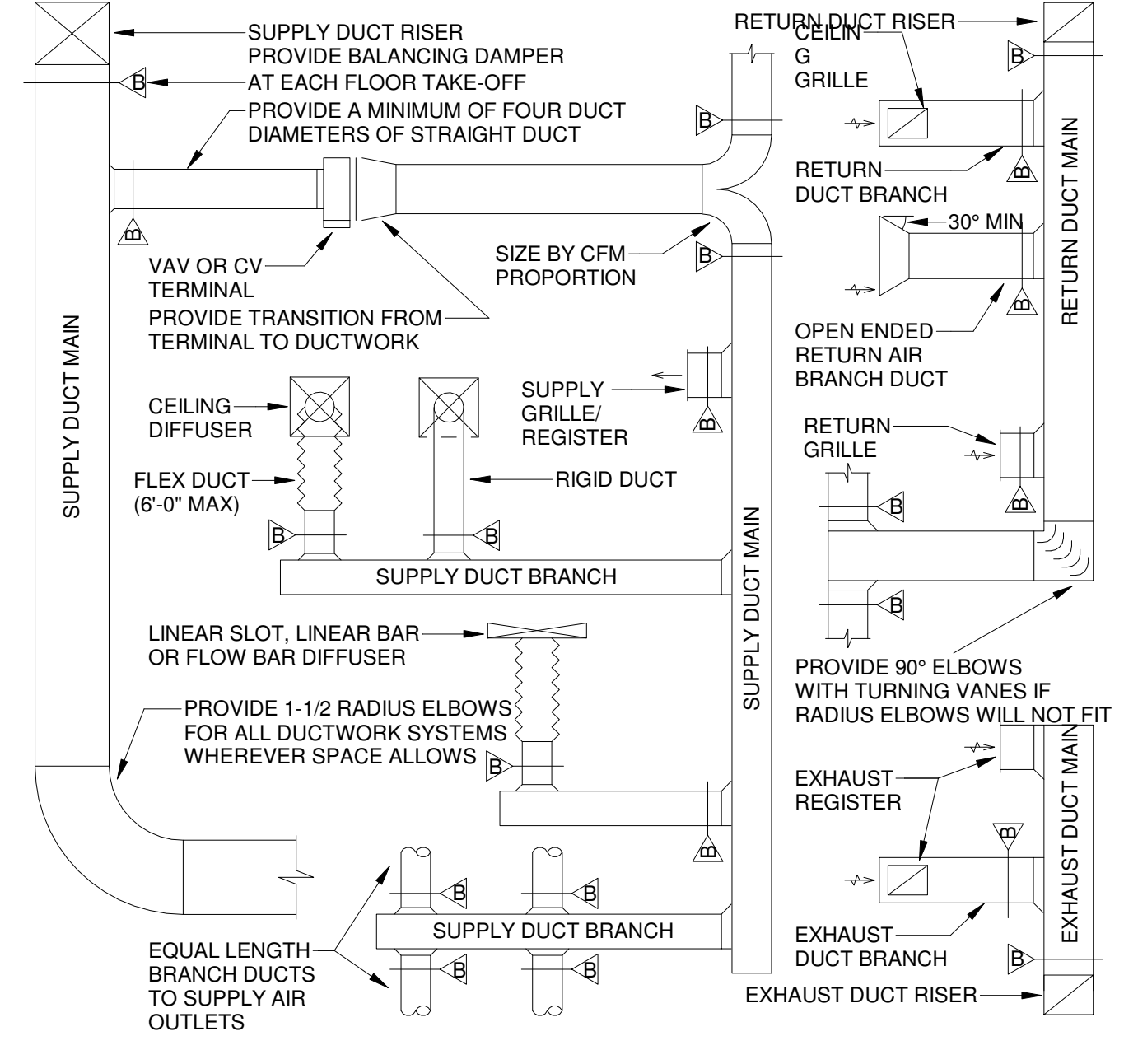


**8** TYPICAL BRANCH TAKEOFF FITTING DETAIL  
NO SCALE

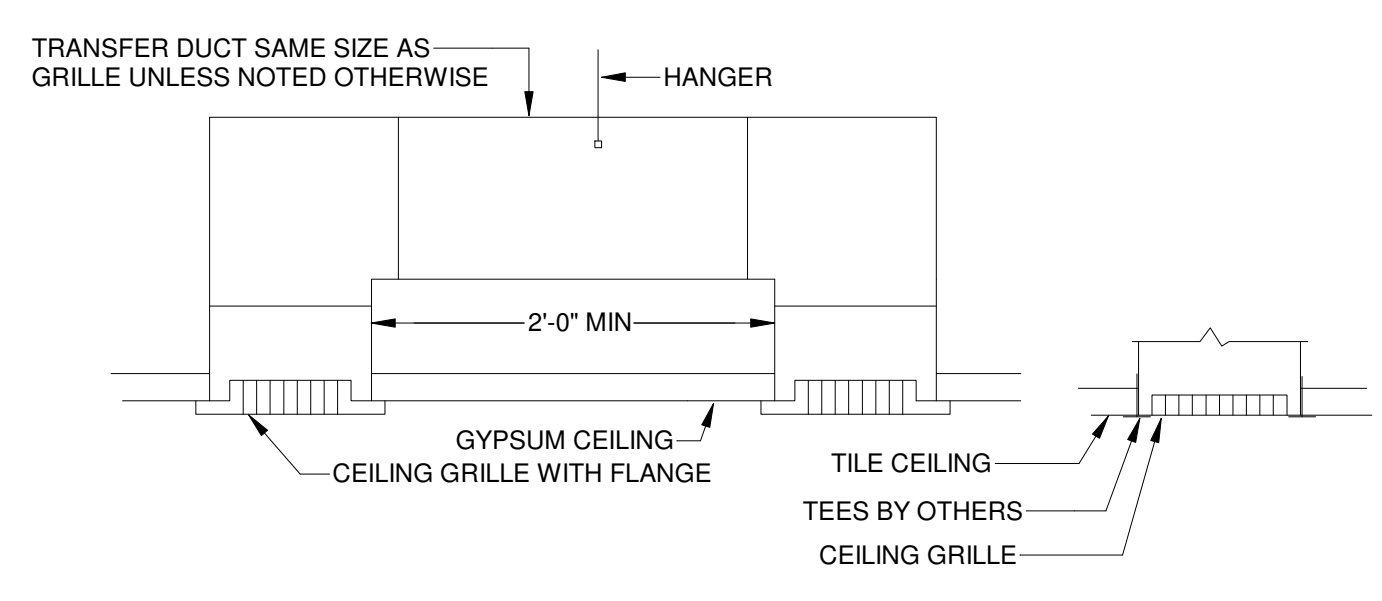


**7** GRILLE & REGISTER BOOT DETAIL  
NO SCALE

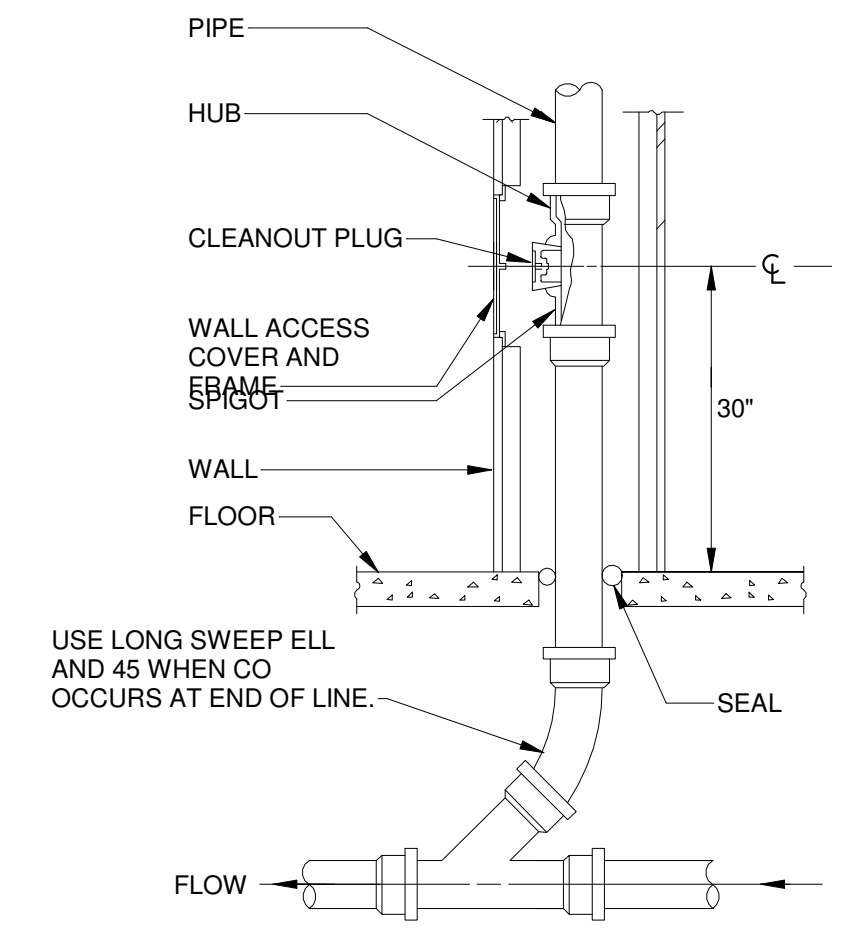
NOTES:  
1. REFER TO HVAC FLOOR PLANS FOR DUCT SIZES  
2. REFER TO SCHEDULES FOR GRILLES, REGISTERS, DIFFUSERS AND TERMINAL SIZES AND TYPES  
3. PROVIDE A MANUAL TYPE BALANCING DAMPER FOR EACH SUPPLY OUTLET AND RETURN INLET  
4. ALL DUCT RUNOUTS TO DIFFUSERS SHALL BE THE SAME SIZE AS DIFFUSER NECK SIZE, UNLESS OTHERWISE NOTED  
5. FLEX DUCT WILL NOT BE ALLOWED ON RETURN OR EXHAUST DUCTWORK SYSTEMS  
6. PROVIDE 12\"/>



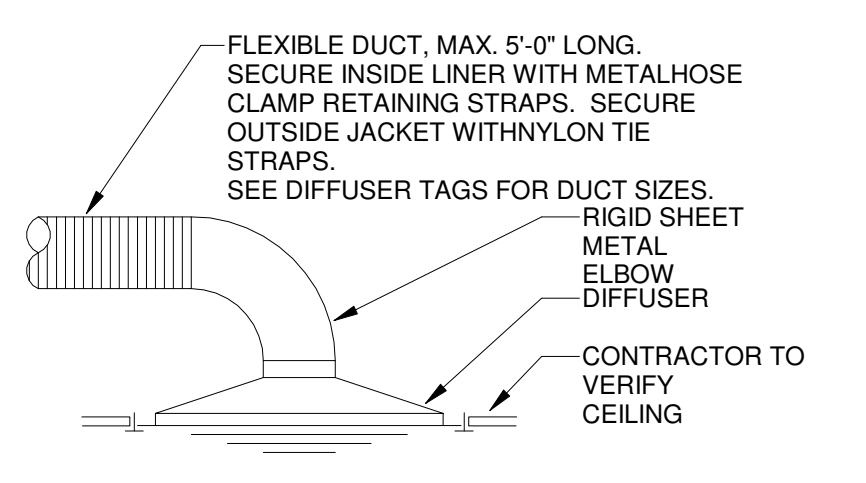
**6** DUCTWORK INSTALLATION DIAGRAM  
NO SCALE



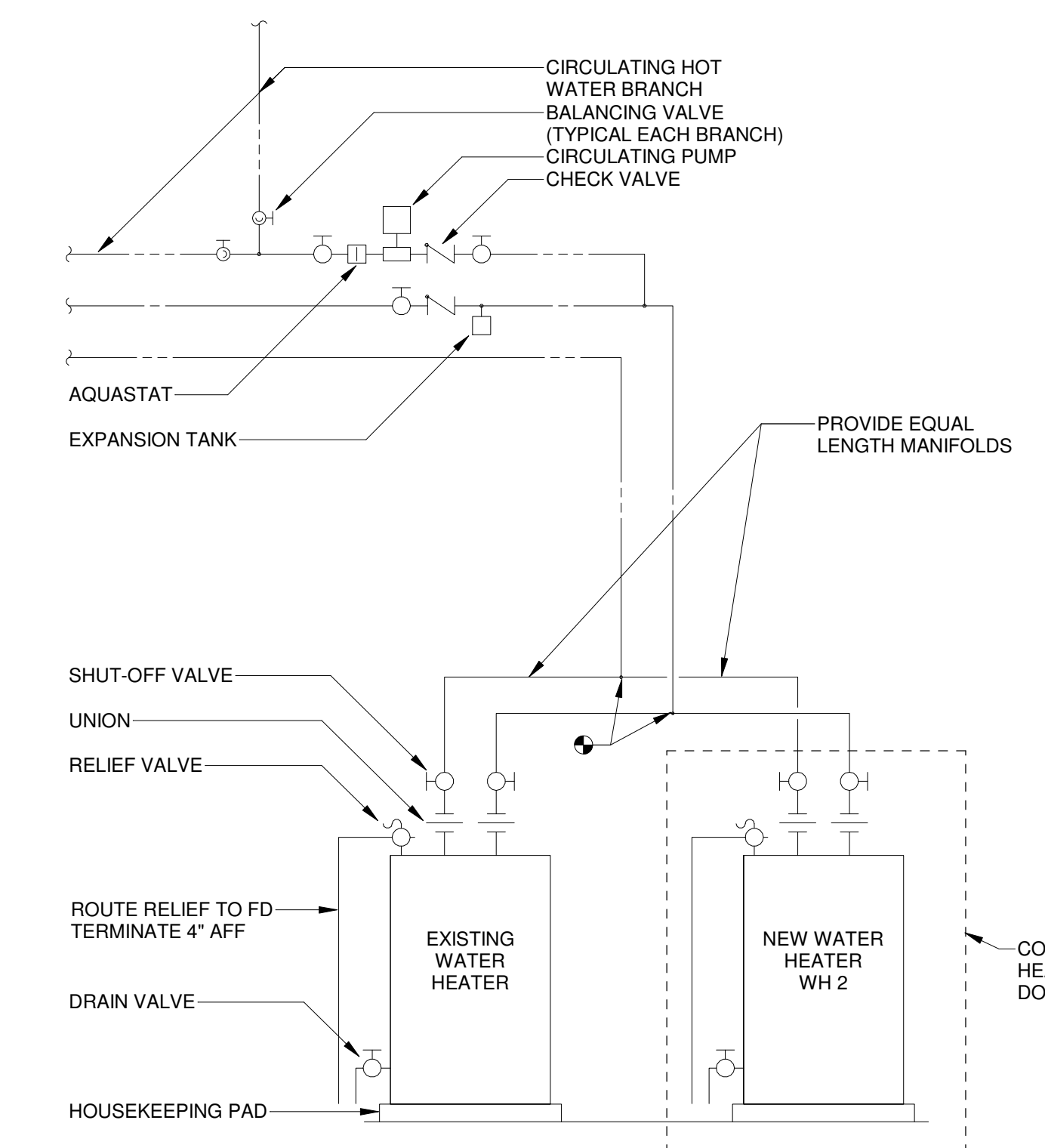
**5** TRANSFER DUCT DETAIL I  
NO SCALE



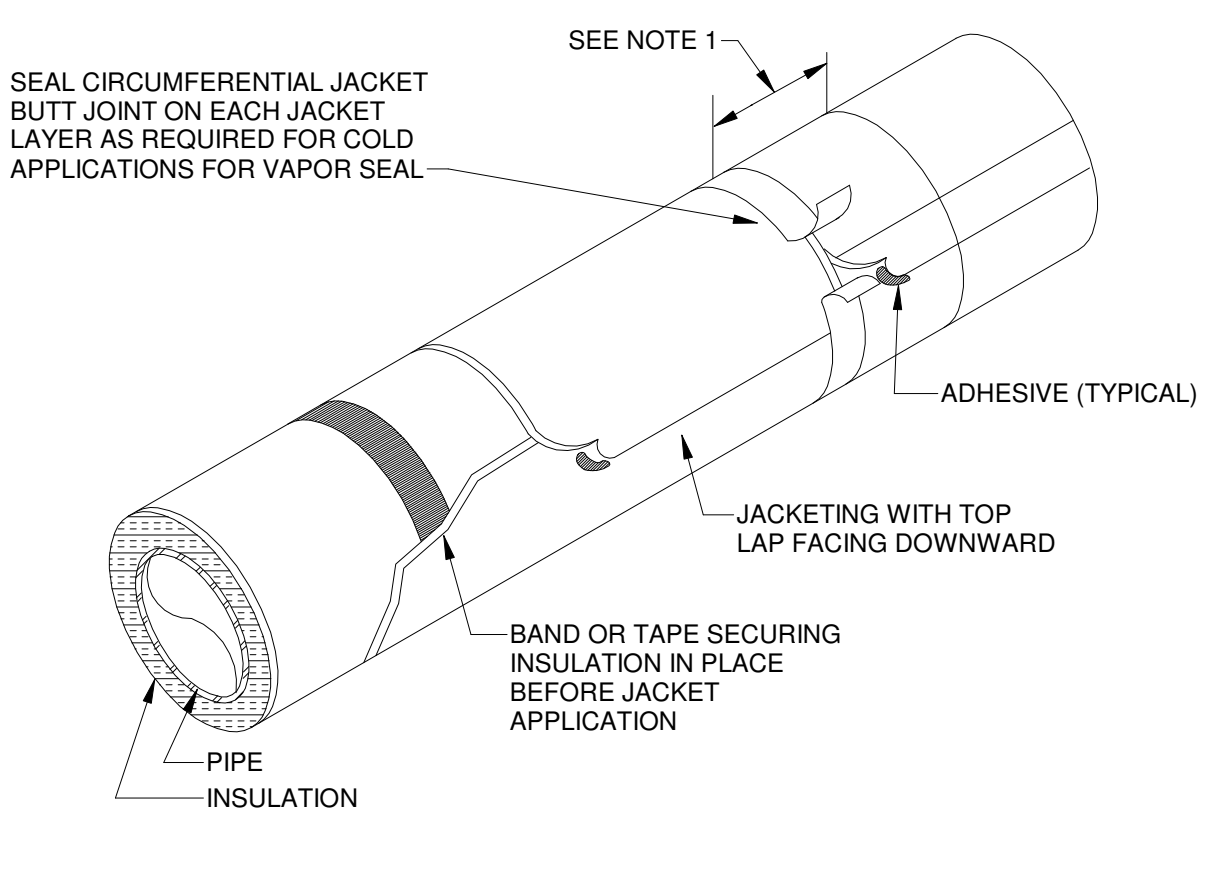
**12** WALL CLEAN OUT DETAIL  
NO SCALE



**11** SUPPLY DIFFUSER CONNECTION DETAIL  
NO SCALE

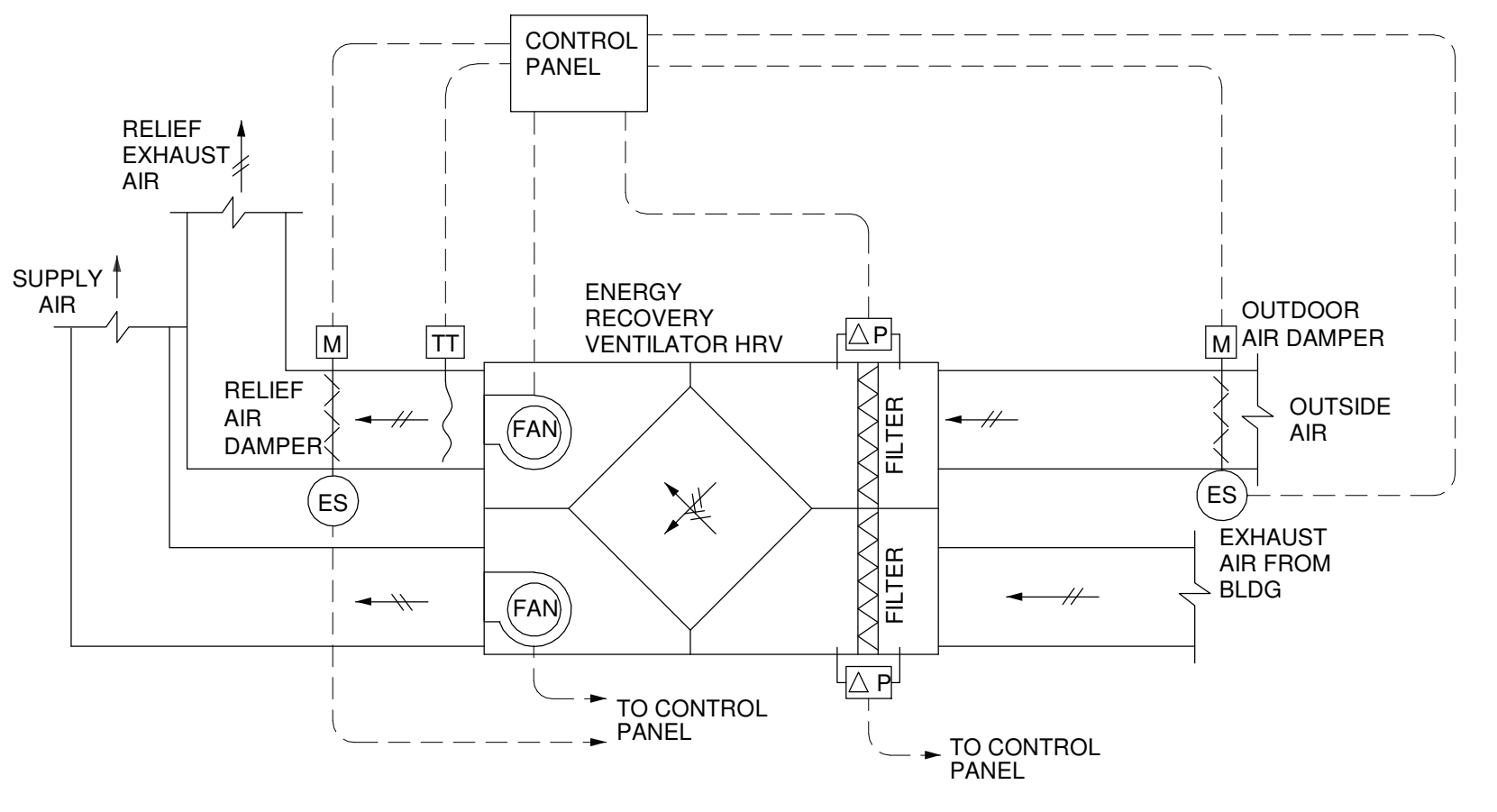


**13** WATER HEATER PIPING DETAIL - MULTIPLE  
NO SCALE



NOTES:  
1. OVERLAP JACKET MINIMUM OF 1-1/2\"/>

**10** FACTORY AND FIELD APPLIED PIPE JACKETING OVER PIPE INSULATION  
NO SCALE



**9** HEAT RECOVERY VENTILATOR CONTROL DIAGRAM  
NO SCALE

SINGLE ZONE FURNACE			
I/O CONTROL POINTS	INPUT	OUTPUT	
OUTSIDE AIR DAMPER STATUS	X	.	.
OUTSIDE AIR DAMPER CONTROL	.	.	X
OUTDOOR AIR FILTER DIFFERENTIAL PRESSURE	X	.	.
HRV SUPPLY FAN START	.	.	X
HRV SUPPLY FAN STATUS	X	.	.
HRV EXHAUST FAN STATUS	X	.	.
HRV EXHAUST FAN START	.	.	X
RELIEF AIR DAMPER STATUS	X	.	.
RELIEF AIR DAMPER CONTROL	.	.	X
RELIEF AIR TEMPERATURE	X	.	.
RELIEF AIR FILTER DIFFERENTIAL PRESSURE	X	.	.

SEQUENCE OF OPERATIONS  
HEAT RECOVERY VENTILATOR CONTROL SEQUENCE

















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# SAFE HAVEN WOMEN'S SHELTER

DULUTH, MN 55812

project #: 020115.00

date: 9/24/2021 2:43:44 PM

drawn by: A.ELMS

checked by: L.GORANSON

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

PRINT NAME: EDWARD L. STUDNISKI

SIGNATURE: *Edward L. Studniski*

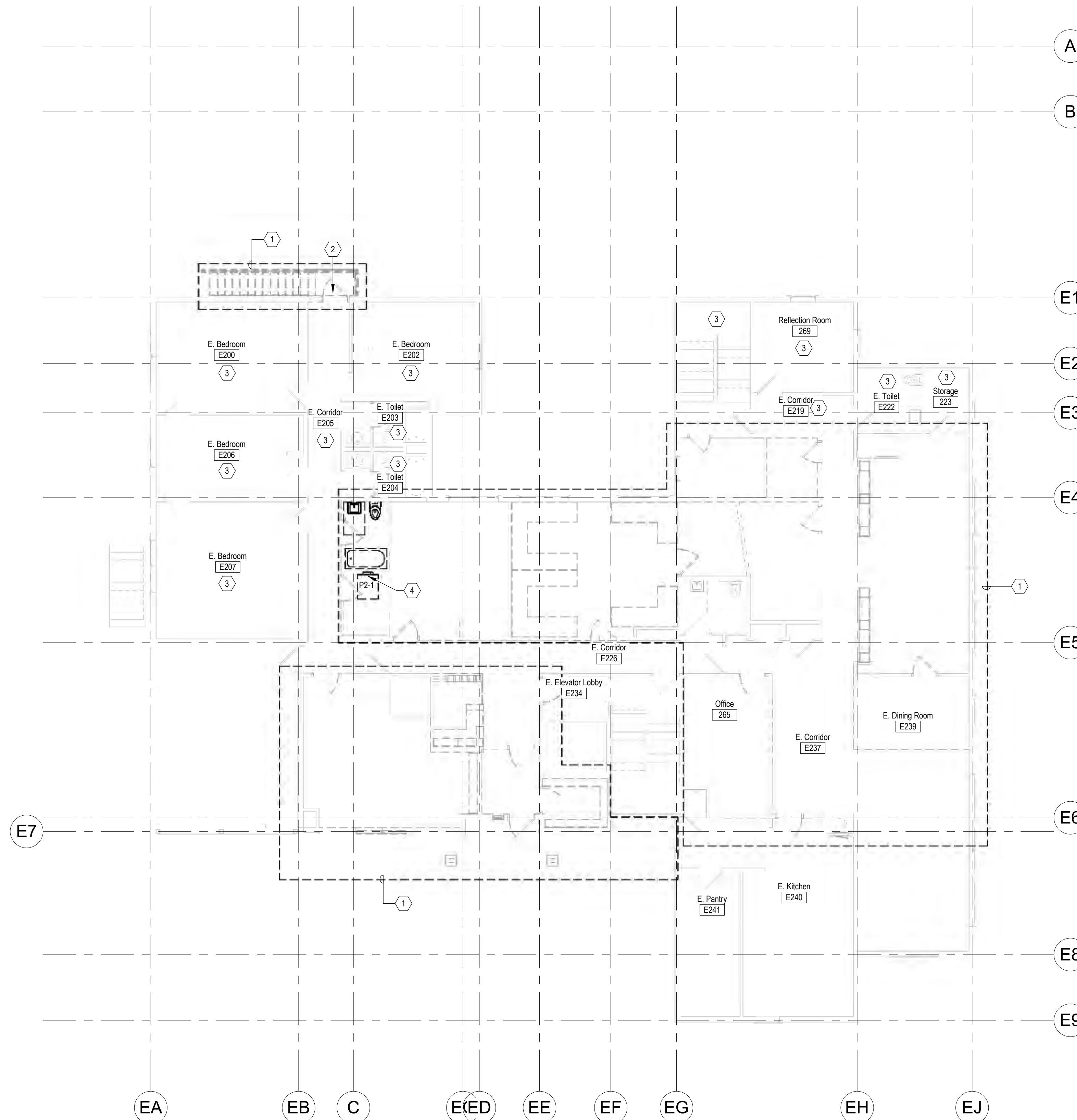
DATE: 9/24/2021 LIC. NO.: 23179

### DEMOLITION SHEET NOTES

- A SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR PHASES OF DEMOLITION AND CONSTRUCTION. COORDINATE WITH GENERAL CONSTRUCTION IN DEMOLITION AREAS UNLESS NOTED OTHERWISE.
- B DISCONNECT AND REMOVE ELECTRICAL DEVICES AND LIGHTING FIXTURES IN DEMOLITION AREAS UNLESS NOTED OTHERWISE.
- C DISCONNECT AND REMOVE ELECTRICAL DEVICES IN WALLS TO BE DEMOLISHED. WALLS TO BE DEMOLISHED ARE SHOWN DASHED. DISCONNECT AND REMOVE ASSOCIATED CONDUIT AND WIRE BACK TO LAST REMAINING DEVICE. FURNISH AND INSTALL CONDUIT AND WIRE AS NECESSARY FOR CONTINUITY OF CIRCUIT(S) TO ANY EXISTING DEVICES TO REMAIN. COORDINATE AND VERIFY REQUIREMENTS WITH NEW WORK IN AREA.
- D FURNISH AND INSTALL CONDUIT AND WIRE AS NECESSARY FOR CONTINUITY OF ANY FEEDERS OR BRANCH CIRCUITS ORIGINATING OUTSIDE THE DEMOLITION AREA THAT SERVES ANY ELECTRICAL EQUIPMENT OR DEVICES TO REMAIN AFTER DEMOLITION. MODIFY OR REPLACE AS REQUIRED.
- E FURNISH AND INSTALL CONDUIT AND/OR COMMUNICATIONS/DATA WIRING AS NECESSARY FOR CONTINUITY OF ANY WIRING ORIGINATING OUTSIDE THE DEMOLITION AREA THAT SERVES ANY COMMUNICATIONS/DATA EQUIPMENT OR DEVICES TO REMAIN AFTER DEMOLITION. MODIFY OR REPLACE AS REQUIRED.
- F DISCONNECT AND REMOVE LIGHT SWITCHES IN DEMOLITION AREAS AS NECESSARY TO ACCOMMODATE NEW DOOR CONFIGURATIONS.
- G DISCONNECT AND REMOVE ANY EXISTING ELECTRICAL DEVICES AND BACK BOXES AS NECESSARY WHERE NEW WALL CONSTRUCTION WILL INTERSECT AN EXISTING WALL. FURNISH AND INSTALL CONDUIT AND WIRE AS REQUIRED FOR CONTINUITY OF CIRCUIT(S).
- H FURNISH AND INSTALL BLANK COVER PLATES OVER EXISTING UNUSED OPENINGS.

### KEYNOTES

- 1 DISCONNECT AND REMOVE LIGHTING, POWER AND SYSTEMS DEVICES COMPLETE ON WALLS AND/OR CEILINGS TO BE DEMOLISHED IN THIS AREA. MAINTAIN EXISTING BRANCH CIRCUITING TO SYSTEMS/DEVICES NOT AFFECTED BY DEMOLITION.
- 2 DISCONNECT AND REMOVE EXTERIOR LIGHTING, ALARM, SECURITY DEVICES AND EXIT SIGNS COMPLETE TO FACILITATE EXTERIOR DOOR REMOVAL.
- 3 DISCONNECT AND REMOVE LIGHTING IN ROOMS NOT AFFECTED BY DEMOLITION TO FACILITATE REPLACEMENT. PATCH EXISTING CEILING AS REQUIRED, REFER TO LIGHTING SHEETS FOR NEW REQUIREMENTS.
- 4 DISCONNECT AND REMOVE EXISTING PANEL P2-1 TO FACILITATE ROOM REMODEL. EXTEND BRANCH CIRCUITS TO NEW PANEL. REFER TO SHEET E3.2 FOR NEW LOCATION.



1 LEVEL 2 DEMOLITION PLAN  
E1.2 1/8" = 1'-0"

revision / issue	no.	date

LEVEL 2  
DEMOLITION  
PLAN  
sheet title:  
sheet  
number:  
**E1.2**

SAFE HAVEN  
WOMEN'S  
SHELTER

DULUTH, MN 55812

Project #: 020115.00

date: 9/24/2021 2:42:13 PM

drawn by: A.ELMS

checked by: L.GORANSON

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PRINT NAME: EDWARD L. STUDNISKI

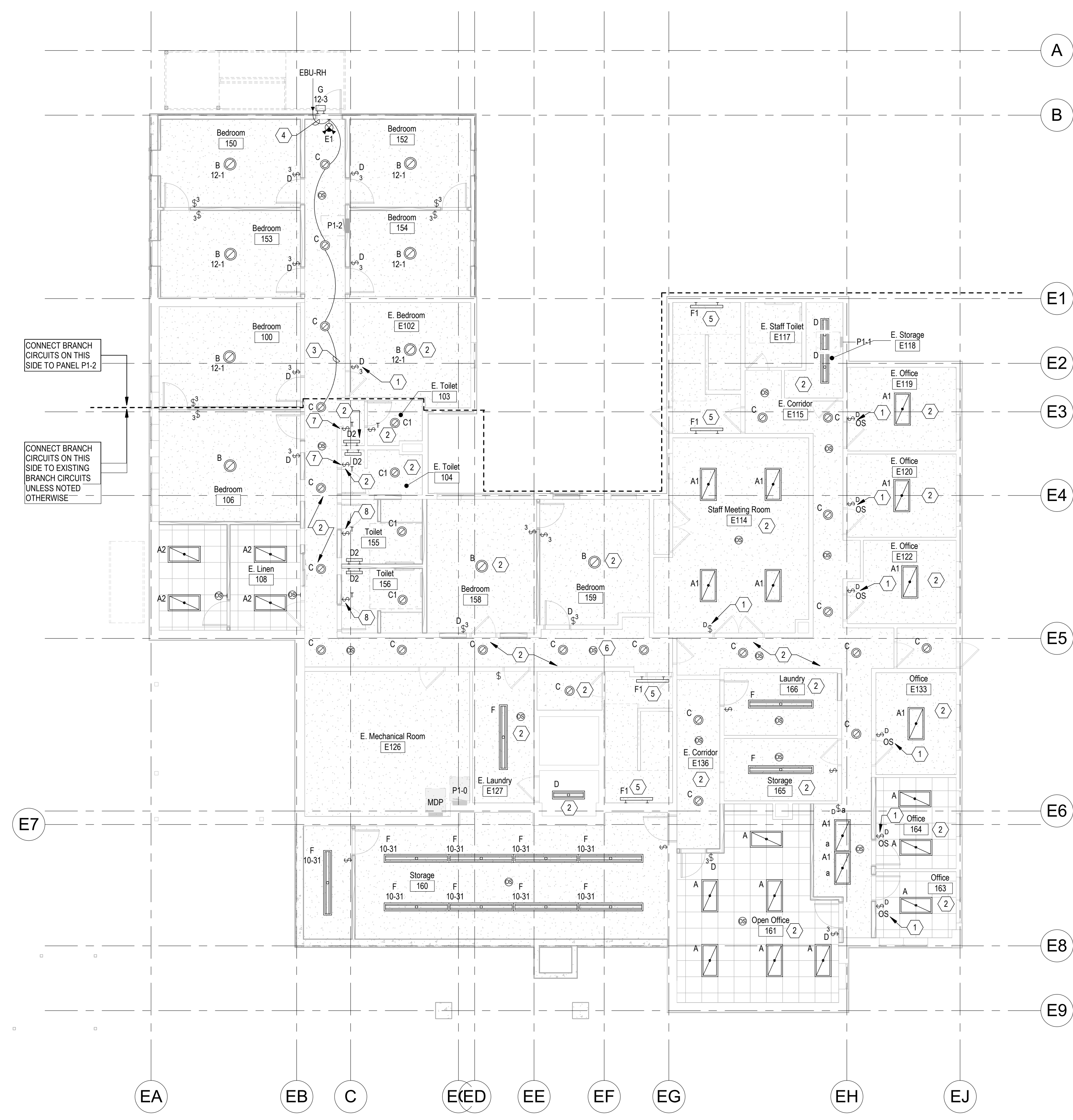
SIGNATURE: *Edward L. Studniski*

DATE: 9/24/2021 LIC. NO.: 23179

- KEYNOTES**
- 1 REPLACE EXISTING DUAL SWITCHING OR SINGLE SWITCH WITH ONE COMBINATION OCCUPANCY SENSOR/DIMMING STYLE SWITCH. PROVIDE CONTROL WIRING AS REQUIRED TO ACHIEVE NEW CONTROL. PROVIDE BLANK COVERPLATE FOR REMOVED SWITCH LOCATION.
  - 2 REPLACE EXISTING LIGHT FIXTURE(S) WITH NEW TYPE. CONNECT TO EXISTING BRANCH CIRCUIT SERVING ROOM/AREA. PROVIDE NEW CONTROL DEVICE(S) AND WIRING. PROVIDE PATCHING OF EXISTING SURFACES.
  - 3 EXTEND EXISTING CORRIDOR BRANCH CIRCUIT AND CONTROL TO NEW CORRIDOR LIGHTING.
  - 4 EXTEND LOW VOLTAGE WIRING.
  - 5 TYPE 'F'1 LIGHT FIXTURE TO INCLUDE INTEGRAL OCCUPANCY SENSOR FOR CONTROL. DURING UNOCCUPIED TIME LIGHT FIXTURES TO DIM TO 10% OUTPUT AND WHEN TURN TO 100% WHILE OCCUPIED.
  - 6 CORRIDOR LIGHTING TO BE CONTROLLED VIA LOCAL OCCUPANCY SENSOR CONTROL. DURING UNOCCUPIED TIME LIGHT FIXTURES TO DIM TO 30% OUTPUT AND WHEN TURN TO 100% WHILE OCCUPIED.
  - 7 REPLACE EXISTING SWITCH WITH NEW 60 MINUTE TIMER SWITCH AS MANUFACTURED BY INTERMATIC MODEL #FF60MC OR EQUIVALENT.
  - 8 PROVIDE 60 MINUTE TIMER SWITCH AS MANUFACTURED BY INTERMATIC MODEL #FF60MC OR EQUIVALENT.

**LIGHTING CONTROL MATRIX**

SYSTEM INPUTS	Controlled by a wall base dimmer control	Controlled by local ceiling or wall occupancy sensor	LV Wiring	Local Time Switch	Photocell	Timeclock	Occupancy Sensor	Light Light
Bedrooms								
Enclosed Offices	•	•						
Conference/Meeting Rooms								
Corridors								
Storage Rooms								
Restrooms								
Restrooms/Shower								
Entry Vestibule								
Exterior Front Canopy								
Exterior Wall Packs @ North Side								
Exterior Wall Packs @ Exit Doors								
Exterior Covered Porch								
Exterior Wall Pack 'G2' - Front Entry								



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# SAFE HAVEN WOMEN'S SHELTER

DULUTH, MN 55812

project #: 020115.00

date: 9/24/2021 2:42:16 PM

drawn by: A.ELMS

checked by: L.GORANSON

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LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: EDWARD L. STUDNISKI

SIGNATURE: *Edward L. Studniski*

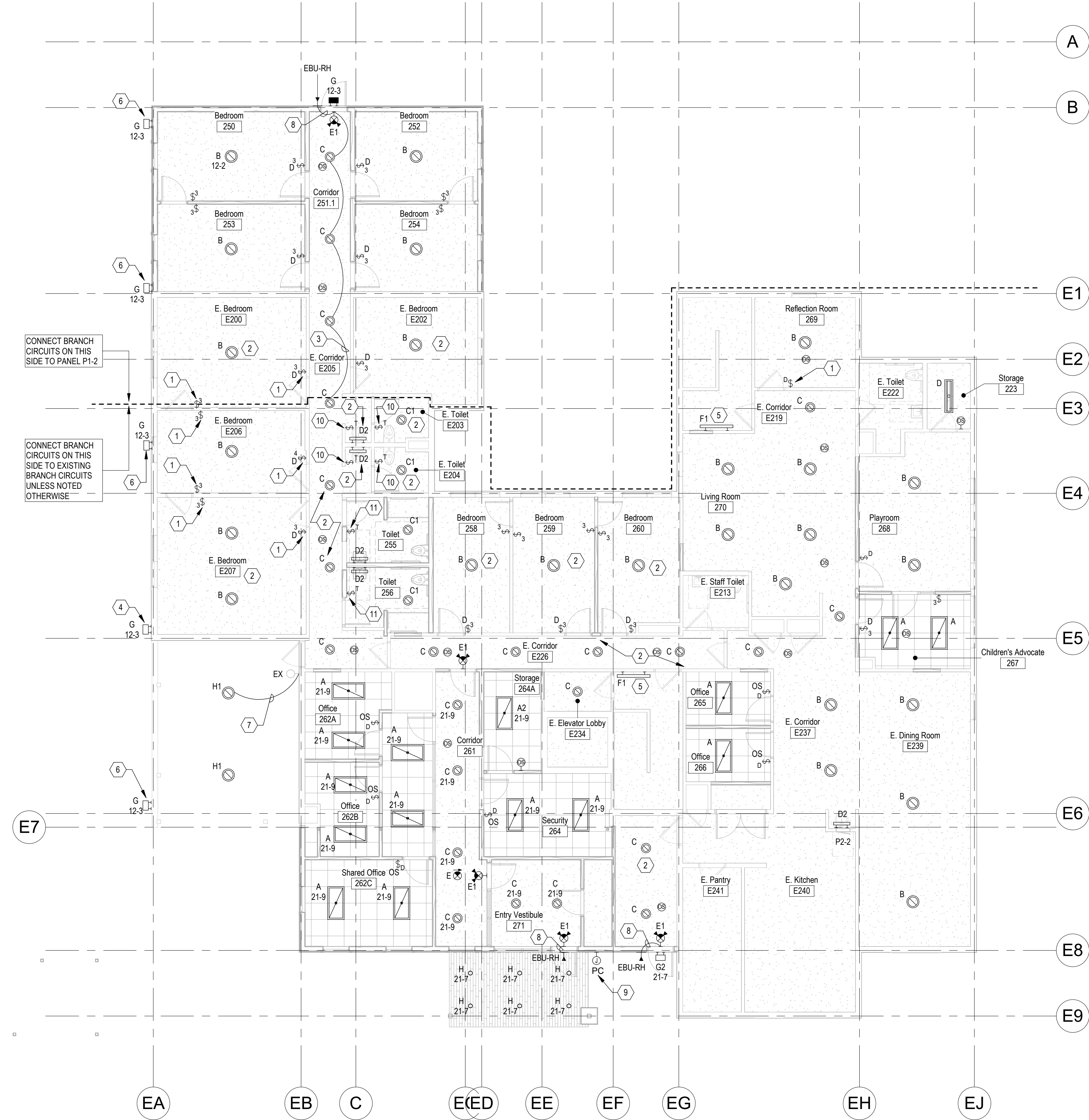
DATE: 9/24/2021 LIC. NO.: 23179

### KEYNOTES

- 1 REPLACE EXISTING DUAL SWITCHING OR SINGLE SWITCH WITH ONE COMBINATION OCCUPANCY SENSOR/DIMMING STYLE SWITCH. PROVIDE CONTROL WIRING AS REQUIRED TO ACHIEVE NEW CONTROL. PROVIDE BLANK COVERPLATE FOR REMOVED SWITCH LOCATION.
- 2 REPLACE EXISTING LIGHT FIXTURE(S) WITH NEW TYPE AS INDICATED. CONTRACTOR TO COORDINATE EXACT LOCATION, QUANTITY, AND MOUNTING TYPE PRIOR TO BID. CONNECT TO EXISTING BRANCH CIRCUIT SERVING ROOM. PROVIDE PATCHING OF EXISTING SURFACES AS REQUIRED.
- 3 EXTEND EXISTING CORRIDOR BRANCH CIRCUIT AND CONTROL TO NEW CORRIDOR LIGHTING.
- 4 REPLACE EXISTING EXTERIOR WALL PACK WITH NEW TYPE AS INDICATED. CONNECT TO EXISTING BRANCH CIRCUIT.
- 5 TYPE 'F1' LIGHT FIXTURE TO INCLUDE INTEGRAL OCCUPANCY SENSOR FOR CONTROL. DURING UNOCCUPIED TIME LIGHT FIXTURE TO DIM TO 10% OUTPUT AND WHEN TURN TO 100% WHILE OCCUPIED.
- 6 INSTALL NEW WALL PACK AT ELEVATION JUST BELOW EXISTING, VERIFY EXACT LOCATION IN FIELD.
- 7 EXTEND EXISTING EXTERIOR WALL LIGHT BRANCH CIRCUIT TO NEW CANOPY LIGHTING AS REQUIRED.
- 8 EXTEND LOW VOLTAGE WIRING AS REQUIRED.
- 9 PROVIDE ADJUSTABLE EYE PHOTOCELL FOR CONTROL OF EXTERIOR LIGHTING. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION IN FIELD.
- 10 REPLACE EXISTING SWITCH WITH NEW 60 MINUTE TIMER SWITCH AS MANUFACTURED BY INTERMATIC MODEL #FF60MC OR EQUIVALENT.
- 11 PROVIDE 60 MINUTE TIMER SWITCH AS MANUFACTURED BY INTERMATIC MODEL #FF60MC OR EQUIVALENT.

### LIGHTING CONTROL MATRIX

SYSTEM INPUTS	CONTROL STRATEGY					
	Controlled by networked control	Controlled by local wiring or wall occupancy sensor	LI Network	Local timer switch	Photocell	Occupancy Sensor
Bedrooms						
Enclosed Offices						
Conference/Meeting Rooms						
Corridors						
Storage Rooms						
Restrooms						
Restrooms/Shower						
Entry Vestibule						
Exterior Front Canopy						
Exterior Wall Packs @ North Side						
Exterior Wall Packs @ Exit Doors						
Exterior Covered Porch						
Exterior Wall Pack '52' - Front Entry						



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# SAFE HAVEN WOMEN'S SHELTER

DULUTH, MN 55812

project #: 020115.00

date: 9/24/2021 2:43:49 PM

drawn by: A.ELMS

checked by: L.GORANSON

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PRINT NAME: EDWARD L. STUDNISKI

SIGNATURE: *Edward L. Studniski*

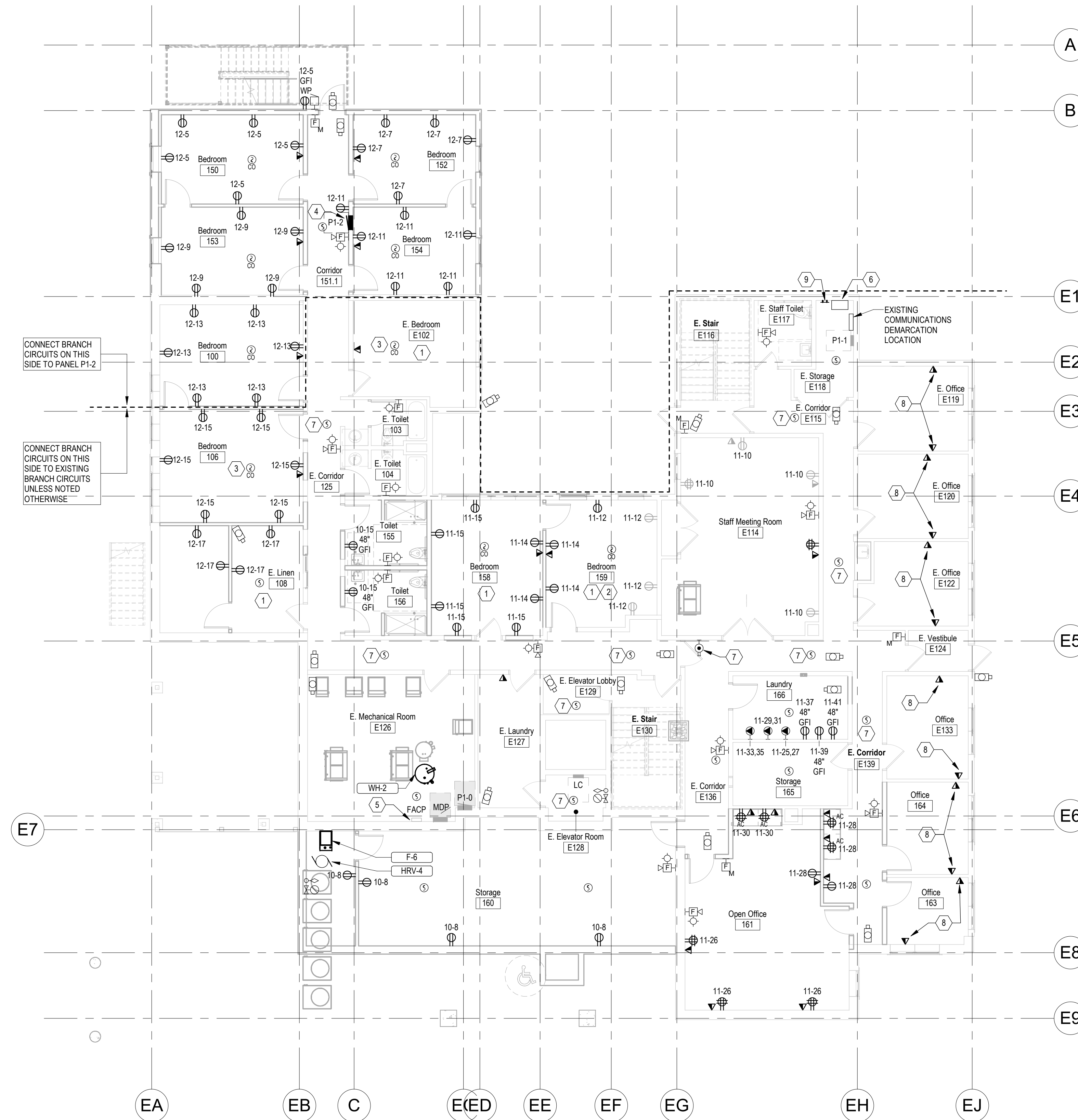
DATE: 9/24/2021 LIC. NO.: 23179

### POWER SHEET NOTES

- A. WIRE COUNTS FOR CIRCUIT CONDUCTORS ARE NOT SHOWN. PROVIDE PROPER NUMBER OF CONDUCTORS TO ACHIEVE CIRCUIT AND SWITCHING CONNECTIONS SHOWN.
- B. CIRCUIT WIRING (INCLUDING HOME RUN) IS NOT SHOWN EXCEPT FOR SWITCHING INTENT OF FIXTURES AND CONTROL OF DEVICES.
- C. RECEPTACLES IN SLEEPING UNITS AND COMMON PUBLIC SPACES TO BE TAMPER RESISTANT TYPE.
- D. COORDINATE FIRE ALARM DEVICE TYPES AND LOCATIONS WITH ESC SYSTEMS.
- E. EXISTING DEVICES TO REMAIN ARE SHOWN LIGHT IN COLOR. NEW DEVICES ARE SHOWN BOLD. EXISTING DEVICES ARE SHOWN FOR REFERENCE ONLY AND ARE NOT REPRESENTATIVE OF ALL EXISTING LOCATIONS.

### KEYNOTES

- 1. REPLACE EXISTING RECEPTACLES WITH NEW TAMPER RESISTANT TYPE.
- 2. EXISTING RECEPTACLES ARE SHOWN WITH EXISTING BRANCH CIRCUIT CONNECTION. EXTEND TO NEW RECEPTACLES IN ROOM.
- 3. REPLACE EXISTING SMOKE DETECTOR WITH 120V COMBINATION SMOKE/CO DETECTOR. PROVIDE INTERFACE RELAY FOR MONITORING AT MAIN FACP.
- 4. PROVIDE CONNECTION TO NEW PANEL P1-2 FROM EXISTING MDP WITH 4 #30 + #6 GND IN 2".
- 5. REPLACE EXISTING FIRE ALARM CONTROL PANEL WITH ADDRESSABLE TYPE.
- 6. PROVIDE WALL MOUNTED DATA RACK FOR NEW PUNCH DOWN BLOCKS AS REQUIRED. COORDINATE EXACT REQUIREMENTS WITH OWNER IT.
- 7. REPLACE EXISTING SMOKE DETECTOR OR AUDIBLE/VISUAL DEVICE WITH NEW ADDRESSABLE TYPE.
- 8. PROVIDE ADDITIONAL LOW VOLTAGE VOICE/DATA DEVICE LOCATIONS AS INDICATED IN EXISTING OFFICE. VERIFY EXACT LOCATIONS WITH OWNER.
- 9. PROVIDE GROUND BAR FOR NEW IT EQUIPMENT.





**SCHEDULE: MDP**

Location: Space 248  
Supply From: MDP  
Mounting: SURFACE  
Enclosure: NEMA 1

Volts: 208Y/120  
Phases: 3  
Wires: 4  
Ground Bus:

A.I.C. Rating: 10,000 AMPS SYMMETRICAL  
Mains Type: MAIN CB  
Mains Rating: 400 A  
Bus Rating: 400 AMPS

Notes: EXISTING PANEL

CCT	Count	Circuit Description	Load Type	Rating	Poles	A	B	C	A	B	C	Poles	Rating	Load Type	Circuit Description	Count	CCT
1	1	ELEVATOR	MTR	100 A	3	9315 VA	9315 VA	9315 VA	2005 VA	2005 VA	2005 VA	3	30 A	MTR	CU-4	1	2
3																	4
5																	6
7																	8
9	1	CU-1	MTR	25 A	3	2005 VA	2005 VA	2005 VA	2005 VA	2005 VA	2005 VA	3	30 A	MTR	CU-5	1	10
11																	12
13																	14
15	1	CU-2	MTR	25 A	3	2005 VA	2005 VA	2005 VA	0 VA	0 VA	0 VA	1	20 A		SPARE		16
17																	18
19																	20
21	1	CU-3	MTR	25 A	3	2005 VA	2005 VA	2005 VA	5 VA	0 VA	0 VA	1	20 A	FA	FACP	1	20
23																	22
25	1	LC	Other	40 A	2	0 VA	0 VA	0 VA	915 VA	915 VA	915 VA	2	30 A	MTR	SEWAGE PUMP	1	26
27																	28
29		SPARE															30
31																	32
33	1	CU-6	MTR	60 A	3	2385 VA	2385 VA	2385 VA	360 VA	360 VA	360 VA	1	20 A		OUTSIDE LIGHTS		34
35																	36
37	1	P1-0	MTR	200 A	2	1260 VA	1260 VA	1260 VA	0 VA	0 VA	0 VA				SPACE		40
39																	42
41		SPACE															44
43		SPACE															46
45	1	P2-2	R, PN	200 A	2	1620 VA	1620 VA	1620 VA	0 VA	0 VA	0 VA				SPACE		48
47																	50
49	1	P1-2	L, R	200 A	3	3270 VA	4128 VA	12200 VA	11020 VA	11020 VA	11020 VA	2	200 A	R, PN	P1-1	1	52
51																	54
53																	
<b>Total Load:</b>						49010 VA	41783 VA	38006 VA									
<b>Total Amps:</b>						413 A	353 A	317 A									

Load Classification	Connected Load	Load Factor	Calculated Load	Panel Totals
Spare	1280 VA	100.00%	1280 VA	
MTR	73782 VA	109.47%	80768 VA	<b>Total Conn. Load:</b> 128800 VA
FA	5 VA	100.00%	5 VA	<b>Total Est. Demand:</b> 126544 VA
L	1593 VA	125.00%	1991 VA	<b>Total Conn.:</b> 358 A
R	29280 VA	67.08%	19640 VA	<b>Total Est. Demand:</b> 351 A
PN	22860 VA	100.00%	22860 VA	

Notes:  
MTR = MOTOR (INCLUDES LARGEST MOTOR)  
L = LIGHTING (CONTINUOUS)  
R = RECEPTACLE  
C = CONTINUOUS  
PN = POWER NON-SEASONAL (NON-CONTINUOUS)  
VT = VERTICAL TRANSPORTATION

**SCHEDULE: P1-1**

Location: Space 231  
Supply From: MDP  
Mounting: SURFACE  
Enclosure: NEMA1

Volts: 120/208  
Phases: 1  
Wires: 3  
Ground Bus:

A.I.C. Rating: 10,000 AMPS SYMMETRICAL  
Mains Type: MCB  
Mains Rating: 200 A  
Bus Rating: 225 AMPS

Notes: EXISTING PANEL - EXISTING LOADS ARE SHOWN AS ITALIX TEXT, NEW/REVISED LOADS ARE SHOWN AS BOLD TEXT

CCT	Count	Circuit Description	Load Type	Rating	Poles	A	B	A	B	Poles	Rating	Load Type	Circuit Description	Count	CCT		
11-1		LIGHTS				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT BATHROOM		11-2		
11-3		LIGHTS				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT OFFICE		11-4		
11-5		LIGHTS				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT OFFICE		11-6		
11-7		BASEBOARD HEAT				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT OFFICE		11-8		
11-9	1	RCPT RM E114	R	20 A	1	180 VA	720 VA	720 VA	720 VA	1	20 A	R	MEETING ROOM RCPTS	4	11-10		
11-11		RCPT REFRIG INTERVENTION				0 VA	0 VA	720 VA	720 VA	1	20 A	R	BEDROOM 159 RCPTS	4	11-12		
11-13		RCPT INTERVENTION				0 VA	720 VA	720 VA	720 VA	1	20 A	R	BEDROOM 158 & 159 RCPTS	4	11-14		
11-15	5	BEDROOM 158 RCPTS	R	20 A	1	900 VA	0 VA	0 VA	0 VA	1	20 A		PLUGMOLD WORK ROOM		11-16		
11-17		STAIRS HEATER	PN	20 A	2	90 VA	0 VA	0 VA	0 VA	1	20 A		COPIER WORK ROOM		11-18		
11-19		EXISTING LOAD	PN	50 A	2	90 VA	0 VA	0 VA	0 VA	1	20 A		RCPT CLERICAL		11-20		
11-21		EXISTING LOAD	PN	50 A	2	90 VA	0 VA	0 VA	0 VA	1	20 A		RCPT CLERICAL		11-22		
11-23		EXISTING LOAD	PN	50 A	2	90 VA	0 VA	0 VA	0 VA	1	20 A		RCPT ADMINISTRATION		11-24		
11-25	1	DRYER	PN	30 A	2	2500 VA	540 VA	720 VA	720 VA	1	20 A	R	RCPT RM 161	3	11-26		
11-27		DRYER	PN	30 A	2	2500 VA	360 VA	720 VA	720 VA	1	20 A	R	RCPT RM 161/162	4	11-28		
11-29	1	DRYER	PN	30 A	2	2500 VA	360 VA	720 VA	720 VA	1	20 A	R	RCPT RM 161	2	11-30		
11-31		DRYER	PN	30 A	2	2500 VA	0 VA	0 VA	0 VA	1	20 A		CORRIDOR RCPT		11-32		
11-33		DRYER	PN	30 A	2	2500 VA	0 VA	0 VA	0 VA	1	20 A		SPACE		11-34		
11-35	1	DRYER	PN	30 A	2	2500 VA	0 VA	0 VA	0 VA	1	20 A		AC-1 CONFERENCE ROOM		11-36		
11-37	1	WASHER	R	20 A	1	1000 VA	0 VA	0 VA	0 VA	1	20 A		ERV-3		11-38		
11-39	1	WASHER	R	20 A	1	1000 VA	0 VA	0 VA	0 VA	1	20 A		SPACE		11-40		
11-41	1	WASHER	R	20 A	1	1000 VA	0 VA	0 VA	0 VA	1	20 A		RCPT MICROWAVE		11-42		
<b>Total...</b>						12200 VA	0 VA	0 VA									
<b>Total...</b>						116 A	0 A	0 A									

Load Classification	Connected Load	Load Factor	Calculated Load	Panel Totals
R	7860 VA	100.00%	7860 VA	<b>Total Conn. Load:</b> 23220 VA
PN	15360 VA	100.00%	15360 VA	<b>Total Est. Demand:</b> 23220 VA
				<b>Total Conn.:</b> 112 A
				<b>Total Est. Demand:</b> 112 A

Notes:  
MTR = MOTOR (INCLUDES LARGEST MOTOR)  
L = LIGHTING (CONTINUOUS)  
R = RECEPTACLE  
C = CONTINUOUS  
PN = POWER NON-SEASONAL (NON-CONTINUOUS)  
VT = VERTICAL TRANSPORTATION

**SCHEDULE: P1-0**

Location: MDP  
Supply From: MDP  
Mounting: RECESSED  
Enclosure: NEMA1

Volts: 120/208  
Phases: 1  
Wires: 3  
Ground Bus:

A.I.C. Rating: 10,000 AMPS SYMMETRICAL  
Mains Type: MLO  
Mains Rating: 225 AMPS

Notes: EXISTING PANEL - EXISTING LOADS ARE SHOWN AS ITALIX TEXT, NEW/REVISED LOADS ARE SHOWN AS BOLD TEXT

CCT	Count	Circuit Description	Load Type	Rating	Poles	A	B	A	B	Poles	Rating	Load Type	Circuit Description	Count	CCT		
10-1		RCPT BEDROOM				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT		10-2		
10-3		RCPT BEDROOM				0 VA	0 VA	0 VA	0 VA	1	20 A		BASEBOARD HEAT UPSTAIRS		10-4		
10-5		LIGHTS				0 VA	0 VA	0 VA	0 VA	1	20 A		BASEBOARD HEAT DOWNSTRS		10-6		
10-7		RCPT BEDROOM				0 VA	0 VA	720 VA	720 VA	1	20 A	R	RCPT RM 160	4	10-8		
10-9		RCPT LAUNDRY				0 VA	0 VA	0 VA	0 VA	1	20 A		FURNACE 1		10-10		
10-11		RCPT BATHROOM				0 VA	0 VA	0 VA	0 VA	1	20 A		FURNACE 3		10-12		
10-13		RCPT BATHROOM				0 VA	0 VA	0 VA	0 VA	1	20 A		FURNACE 2		10-14		
10-15	2	RCPT BATHROOM	R	20 A	1	360 VA	0 VA	0 VA	0 VA	1	20 A		HRV 1		10-16		
10-17		RCPT				0 VA	0 VA	0 VA	0 VA	1	20 A		HRV 2		10-18		
10-19		RCPT				0 VA	0 VA	0 VA	0 VA	1	20 A		DISHWASHER/REFRIG		10-20		
10-21	1	DRYER	PN	30 A	2	0 VA	0 VA	0 VA	0 VA	1	20 A		CIRCULATING PUMP		10-22		
10-23						0 VA	0 VA	510 VA	510 VA	2	15 A	MTR	HRV-4	1	10-24		
10-25		RCPT WASHER				0 VA	0 VA	510 VA	510 VA	1	20 A		WATER HEATER		10-28		
10-27		RCPT WASHER				0 VA	0 VA	0 VA	0 VA	1	20 A		SUMP PUMP		10-30		
10-29		RCPT				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT PLAYROOM REFRIG		10-32		
10-31	9	LIGHTING RM 160	L	20 A	1	423 VA	0 VA	0 VA	0 VA	1	20 A		RCPT PLAYROOM REFRIG		10-34		
10-33		RCPT WASHER				0 VA	750 VA	750 VA	750 VA	1	20 A	MTR	F-6	1	10-36		
10-35	1	DRYER	PN	30 A	2	0 VA	0 VA	0 VA	0 VA	1	20 A		FURNACE 4		10-38		
10-37		DRYER	PN	30 A	2	0 VA	0 VA	0 VA	0 VA	1	20 A		FURNACE 5		10-40		
10-39		RCPT				0 VA	0 VA	0 VA	0 VA	1	20 A		RCPT POP MACHINE		10-42		
10-41		SPACE				0 VA	0 VA	0 VA	0 VA	1	20 A	MTR	WH-2	1	10-44		
<b>Total...</b>						1260 VA	0 VA	0 VA									
<b>Total...</b>						12 A	0 A	0 A									

Load Classification	Connected Load	Load Factor	Calculated Load	Panel Totals
MTR	1769 VA	114.40%	2024 VA	<b>Total Conn. Load:</b> 3272 VA
L	423 VA	125.00%	529 VA	<b>Total Est. Demand:</b> 3633 VA
R	29280 VA	100.00%	1080 VA	<b>Total Conn.:</b> 16 A
PN	0 VA	0.00%	0 VA	<b>Total Est. Demand:</b> 17 A

Notes:  
MTR = MOTOR (INCLUDES LARGEST MOTOR)  
L = LIGHTING (CONTINUOUS)  
R = RECEPTACLE  
C = CONTINUOUS  
PN = POWER NON-SEASONAL (NON-CONTINUOUS)  
VT = VERTICAL TRANSPORTATION

**SCHEDULE: P1-2**

Location: Space 268  
Supply From: MDP  
Mounting: RECESSED  
Enclosure: NEMA1







## ADDENDUM ONE (1)

*project* Safe Haven Women's Shelter  
Duluth, Minnesota  
*project #* 020115.00  
*date* November 4, 2021  
*from* John Erickson DSGW Architects, Inc.  
*to* All planholders for above project

The following addendum shall become part of the construction documents for the construction of the above referenced project.  
This addendum supersedes and supplements all previous reference to similar items.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am duly a Licensed Architect under the laws of the State of Minnesota.

Signature John E. Erickson  
Registration # 24199  
Date November 4, 2021

*specifications*

SECTION	DESCRIPTION
<b>09 51 00</b>	<b>SUSPENDED ACOUSTICAL CEILINGS</b> 1. OMIT this section as originally issued and REPLACE with REVISED Section 09 51 00 as included with this addendum.

*drawings*

SECTION	DESCRIPTION
<b>A2.3</b>	<b>ROOF PLAN</b> 1. Floor & Roof/Ceiling Assemblies: REVISED detail notes.
<b>A3.1</b>	<b>LEVEL 1 &amp; LEVEL 2 REFLECTED CEILING PLANS</b> 1. Reflected Ceiling Plan Legend: REVISED as shown. 2. 2/A3.1: REVISED as shown.

*enclosures*

- Spec. Section 09 51 00 – Suspended Acoustical Ceilings – Revised (3 pages)
- Arch. Drawing Sheets: A2.3 & A3.1 (24x36)(2 pages)

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This addendum shall become part of this bid. The bidder shall insert the addendum number in the space where indicated on the proposal form. Failure to comply may result in the bid being rejected.

**END OF ADDENDUM ONE (1)**



**SECTION 09 51 00**  
**SUSPENDED ACOUSTICAL CEILINGS - REVISED**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 RELATED REQUIREMENTS**

- A. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- B. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.

**1.03 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.

**1.06 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.07 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**PART 2 PRODUCTS**

**2.01 ACOUSTICAL UNITS**

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
- C. SACT-1:
  - 1. USG Mars # ~~86185HRC 2'x2'~~ 86785
  - 2. Series: Mars Acoustical Panels
  - 3. Size: 2'x2'
  - 4. Acoustics: 0.75 NRC
  - 5. Fire Performance Class A
  - 6. Color: White

- ~~D. ACT 2:~~
- ~~1. Donn Band DXW 1-1/2" Acoustical Suspension System~~
  - ~~2. Series:~~
  - ~~3. Size: 2'x2'~~
  - ~~4. Acoustics:~~
  - ~~5. Fire Performance Class A~~
  - ~~6. Color: Flat Black 205~~

## **2.02 SUSPENSION SYSTEM(S)**

- A. Manufacturers:
  1. Same as for acoustical units.
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
  1. Profile: Tee; 15/16 inch wide face.
  2. Construction: Double web.
  3. Finish: White painted.

## **2.03 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Wood Veneer Panel Safety Clips: Galvanized 1-9/16 by 5-1/2 inch bent sheet metal clips screw anchored to back of adjacent panels and spanning over top of suspended tee grid.
  1. Wire Ties: No. 12 galvanized wire.
- C. Perimeter Moldings: Same material and finish as grid.
  1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- D. Furnish and install ceiling hold down clips for all lay-in ceilings that are installed in Vestibules or within twenty feet of an exterior door.
- E. Ceiling holddown clips.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.

- H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.

**3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

**3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**







# REFLECTED CEILING PLAN LEGEND

**EXIST. GYPSUM BOARD**

**TONGUE & GROOVE WOOD CEILING**

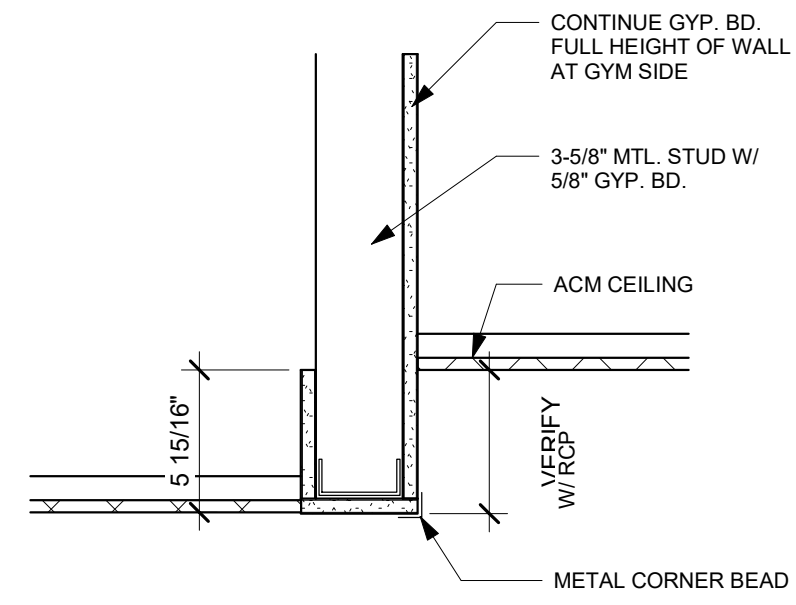
**LIGHT FIXTURES - SEE ELECT**

**MECHANICAL FIXTURES - SEE MECH**

1 LAYER GYPSUM BOARD APPLIED TO BOTTOM OF TRUSS OR FLOOR JOIST  
1 LAYER GYPSUM BOARD SUSPENDED TO CEILING HEIGHT IDENTIFIED

1 LAYER GYPSUM BOARD APPLIED TO BOTTOM OF TRUSS OR FLOOR JOIST  
SACT-1 2'-0" X 2'-0" SUSPENDED ACOUSTICAL CEILING TILE AND GRID INSTALLED AT CEILING HEIGHT IDENTIFIED

\*SEE FLOOR & ROOF/CEILING ASSEMBLIES FOR REFERENCE



NOTE: SEE RCP FOR BULKHEAD HEIGHTS

**3 BULKHEAD DETAIL**  
1 1/2" = 1'-0"

# RCP GENERAL NOTES

1. COORDINATE FINAL LOCATIONS OF CEILING MOUNTED EQUIPMENT W/ OWNER AND ARCHITECT.
2. SEE M&E DRAWINGS FOR LIGHTING, GRILLS, AND DIFFUSER LOCATIONS.
3. SUSPENDED ACOUSTICAL CEILING TILE GRID IS TO BE CENTERED IN RECTANGULAR ROOM OR CENTERED BETWEEN THE LONGEST WALLS OF IRREGULARLY SHAPED ROOMS UNLESS OTHERWISE NOTED.
4. VERIFY GYPSUM BOARD CONTROL JOINT LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
5. CEILING HEIGHTS INDICATED ARE FROM FINISHED FLOOR OF CURRENT LEVEL SHOWN.



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# SAFE HAVEN WOMEN'S SHELTER

P.O. Box 3558  
DULUTH, MN 55803

project #: 020115.00  
date: 11/4/2021 9:25:29 AM  
drawn by: VP  
checked by: JS

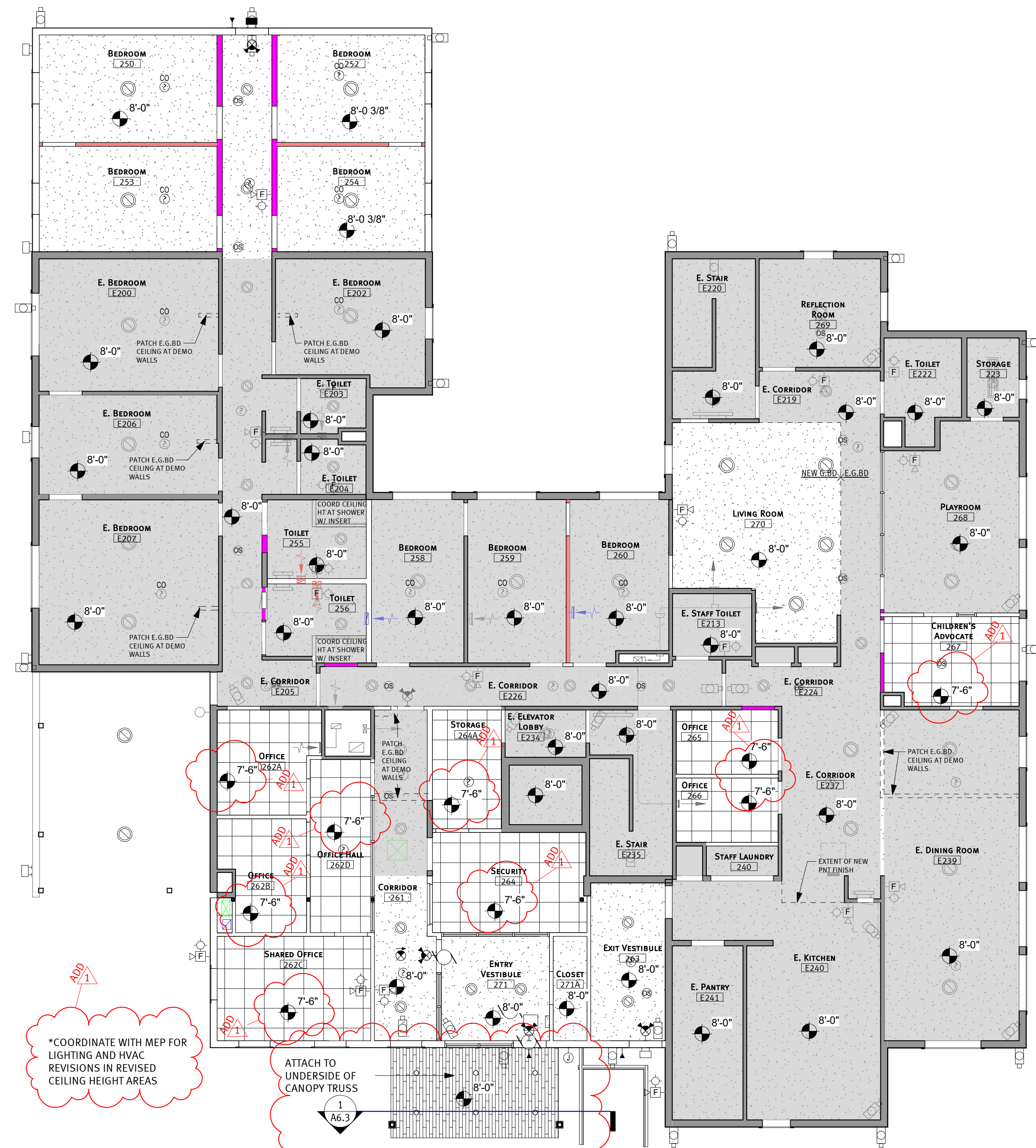
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the state of Minnesota.

signature: *John E. Erickson*  
printed name: JOHN E. ERICKSON, NCARB, LEED AP  
reg. #: 24199  
sign date: 9-24-21

revision / issue	no.	date
ADD	1	11/04/21



**1 LEVEL 1 RCP**  
1/8" = 1'-0"



**2 LEVEL 2 RCP**  
1/8" = 1'-0"

LEVEL 1 & LEVEL 2  
REFLECTED  
CEILING PLANS

sheet number:  
**A3.1**

## Subcontract Agreement

**Subcontract No.:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Contact Person:** \_\_\_\_\_

This Subcontract between The Boldt Company, also known as, Oscar J. Boldt Construction Co., a Wisconsin Corporation (“Boldt”), and \_\_\_\_\_ (“Subcontractor”) is entered into as of the date first written above (the “Subcontract”). The Subcontract is issued in connection with Boldt’s obligations as the general contractor or construction manager for: \_\_\_\_\_ (the “Project”) pursuant to the contract (“General Contract”) between Boldt and \_\_\_\_\_ (“Owner”), and in accordance with Drawings and Specifications identified in Section 1 below. The Architect is the person or entity retained to prepare the Drawings and Specifications.

**WITNESSETH:** Boldt and Subcontractor, in consideration of the mutual promises in this Subcontract agree as follows:

**Section 1. SUBCONTRACTOR’S SCOPE OF WORK (“Subcontractor’s Work”).** Subcontractor agrees to furnish and pay for all management, supervision, financing, labor, construction facilities, materials, tools, supplies, equipment and services required to perform the work, including any incidental engineering and/or testing, necessary to diligently, timely, and fully perform and complete in a good and workmanlike manner the following part or parts of the work as set forth in the General Contract and all incidental work necessary to complete the Subcontractor’s Work for its intended purpose, as follows:

See attached Subcontractor’s Work Exhibit.

**Section 2. SUBCONTRACT AMOUNT (“Subcontract Amount”).** In consideration of the faithful performance of the covenants, agreements and conditions of this Subcontract, to the full satisfaction and acceptance of Owner, Architect and Boldt, Boldt agrees to pay, or cause to be paid, to Subcontractor the following Subcontract Amount in accordance with the terms, conditions, provisions and requirements of this Subcontract:

---

Please reference this accounting breakdown for billing purposes.

DESCRIPTION	ACCOUNTING CODE	AMOUNT
-------------	-----------------	--------

**Section 3. PROJECT SPECIFIC PROVISIONS: (if any)**

See attached Project Specific Provisions Exhibit.

**Project address:**

**Section 4. SUBCONTRACT DOCUMENTS.** The Subcontract Documents consist of this Subcontract, the Exhibits set forth in Section 28, the General Contract (including the General, Supplementary and other Conditions and Exhibits to the General Contract), the Drawings, Specifications and all Addenda identified in Section 1, and all Modifications issued after the date of this Subcontract (“Subcontract Documents”). All of these documents are a part of this Subcontract and shall be available for inspection by the Subcontractor upon its request. Subcontractor shall be bound to Boldt by the terms of this Subcontract and by the terms of

## Subcontract Agreement

Subcontract No.: \_\_\_\_\_

Date: \_\_\_\_\_

Contact Person: \_\_\_\_\_

the General Contract, insofar as applicable to the Subcontractor's Work. Subcontractor shall be obligated to Boldt to perform Subcontractor's Work, as defined above, in strict accordance with all of the obligations and responsibilities that Boldt, by the General Contract, assumes toward Owner. If any provision of the General Contract between Owner and Boldt is inconsistent with any provision of this Subcontract, this Subcontract shall govern. The Subcontract Documents do not include the instructions to bidders, any request for proposal or quotation, or Subcontractor's estimate, proposal or bid unless these documents are expressly identified in the Subcontract as Subcontract Documents.

**Section 5. INVESTIGATION.** Subcontractor will conduct a reasonable inspection, investigation and research of the conditions and circumstances affecting the performance of Subcontractor's Work and does not unreasonably rely upon any statement or representation by Boldt, Owner or Architect regarding the Subcontractor's Work or impacting Subcontractor's ability to perform Subcontractor's Work.

### Section 6. PROGRESS PAYMENTS.

- a. Subcontractor shall follow the procedure in this Section 6, for submitting its Applications for Payment unless a different procedure is specified by the Owner. Prior to, or in conjunction with, submitting its first monthly Application for Payment, Subcontractor shall submit, for Boldt's approval, a pay request breakdown form ("Schedule of Values") listing the major elements of the Subcontractor's Work and the dollar value of each element. This form shall be completed by Subcontractor each month to show the proportionate amount of each element completed to date and shall be attached to a completed copy of the Application for Payment form attached to the Subcontract as Exhibit A. Payments made to Subcontractor in any month without this form being submitted shall not be a waiver of Boldt's right to demand such form prior to Boldt's approval of any subsequent Applications for Payment.
- b. Prior to, or in conjunction, with submitting its first monthly Application for Payment, Subcontractor shall, by affidavit, submit a full and complete list of all of its proposed sub-subcontractors and suppliers, showing the work and materials to be provided by each and the dollar amount of each proposed sub-subcontract and/or purchase order (Exhibit F). The sub-subcontractors and suppliers must be approved by Boldt. A sub-subcontractor or supplier may not be changed without the advance written approval of Boldt. For purposes of this Subsection 6.b., sub-subcontractors and suppliers are considered material if the proposed subcontract and/or purchase order exceeds Five Thousand Dollars (\$5,000.00). Such material sub-subcontractors and suppliers must be approved by Boldt, which approval shall not be unreasonably withheld, conditioned or delayed. A material sub-subcontractor or supplier may not be changed without the advance written approval of Boldt, which approval shall not be unreasonably withheld, conditioned or delayed.
- c. Unless a different procedure is required for this Project, Subcontractor's Application for Payment shall be submitted to Boldt a sufficient number of days prior to the date that Boldt's application for payment is due to the Owner to allow Boldt to make timely application for payment to the Owner. In the event Subcontractor fails to submit its Application for Payment in a timely manner, Subcontractor's Application for Payment shall not be processed for payment until the next payment period after Subcontractor submits an Application for Payment. Boldt shall indicate in the Subcontract when the Application for Payment is due to Boldt.
- d. Unless a different percentage is required by applicable law, set forth within Section 3, Project Specific Provisions, or the General Contract, Boldt shall retain ten percent (10%) of the gross amount of each monthly Application for Payment or ten percent (10%) of the portion approved for payment, whichever is less. Retainage will be released as provided in the General Contract.
- e. Unless provided otherwise by applicable law and provided that Subcontractor has submitted its properly completed Application for Payment in a timely manner and that Application for Payment has been approved by Owner and Architect, Boldt shall issue payment to Subcontractor within ten (10) calendar days of Boldt's receipt of payment from Owner that includes payment for Subcontractor's Application for Payment.

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- f. Monthly progress payments to Subcontractor shall in no way imply approval of Subcontractor's Work or constitute a waiver of any other rights of Boldt or Owner.
- g. Each Application for Payment shall be accompanied by: (i) an invoice (ii) an affidavit showing that all of Subcontractor's materials, labor and other bills have been paid; (iii) an appropriate waiver of lien in the amount of Subcontractor's pending Application for Payment; and (iv) such other documents as may be required by Owner, Architect, the General Contract or requested by Boldt. The affidavit and waiver shall be on Exhibit B, unless Owner requires a different form. Boldt shall not be required to pay any Application for Payment of Subcontractor until these documents are furnished by Subcontractor. Boldt reserves the right to demand and receive similar affidavits and waivers of lien from Subcontractor's sub-subcontractors and suppliers as a condition precedent to payment being due Subcontractor.
- h. Boldt may, at Boldt's sole option, make direct or joint check payments to Subcontractor and its material suppliers and/or sub-subcontractors and/or for any labor costs. Endorsement of a direct or joint check shall constitute a lien waiver and/or waiver of bond rights by the payee(s) of such check up to the full amount of the check.
- i. Advance payment up to the full Subcontract Amount may be made by Boldt if, in the opinion of Boldt in its sole discretion, such advance is considered proper to aid Subcontractor in the performance of this Subcontract.
- j. Subject to approval by the Owner, Applications for Payment may include materials and equipment not yet incorporated in the Project, but delivered to and suitably stored on or off the Project site. Approval of payment applications for such stored items on or off the Project site shall be conditioned upon submission by the Subcontractor of bills of sale and required insurance or such other procedures satisfactory to the Owner and Boldt to establish the Owner's title to such materials and equipment, or otherwise to protect the Owner's and Boldt's interest including transportation to the Project.
- k. Unless provided otherwise by applicable law, the provisions of the Subcontract stating the time and amount of progress and final payments are subject to the condition that Boldt shall receive from Owner progress or final payments in at least the amounts payable to Subcontractor on account of Subcontractor's Work completed on the Project; otherwise, the time when such payments shall be due Subcontractor shall be postponed until Boldt has received the same from Owner. If Owner withholds payment in whole or in part as a result of Subcontractor's Work that is defective or rejected, or other bona fide dispute, Subcontractor shall not be entitled to payment of such withheld amounts until the claim is resolved. Subcontractor agrees that the liability of the surety on Boldt's payment bond, if any, for payment to Subcontractor, is subject to the same conditions precedent as are applicable to Boldt's liability to Subcontractor.
- l. If the Subcontract Amount is based upon a time and material or cost reimbursable basis, Subcontractor will be reimbursed for costs in accordance with the Cost of the Work as defined in the General Contract. Any request for reimbursement must be submitted within the time limits as set forth in the General Contract or within three (3) months of when the cost is incurred, whichever is shorter. Any request for reimbursement received after this time are waived. Boldt or the Owner may request an audit of the labor rates, material, equipment rental and other costs associated with the Subcontractor's Work and Subcontractor shall provide copies of this information to Boldt upon request. Each payment previously made shall be subject to reduction to the extent amounts on preceding vouchers are found by Boldt or its authorized representative not to have been properly payable and shall also be subject to reduction for overpayments or to increase for underpayments. Subcontractor shall retain its cost and Project records, including all electronic records, for the period of time required by the General Contract or three (3) years, whichever is longer and shall make such records available to Boldt upon reasonable notice.

**Section 7. FINAL PAYMENT.** Subject to Sections 8 and 20 and unless provided otherwise by applicable law or the General Contract, Boldt shall issue final payment to Subcontractor within ten (10) calendar days after Boldt's receipt of final payment from the Owner for Subcontractor's Work provided that the Subcontractor's Work is complete, including all punch list work, and accepted by Owner and Architect ("Final Completion"). As a condition of final payment, Subcontractor shall have furnished Boldt with a properly executed Final Release and Waiver of Liens (Exhibit C) and Subcontractor's Warranty of Construction (Exhibit



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D) and any other project closeout documents required by this Subcontract, the General Contract and/or the Owner, Architect or any public authority. Subcontractor's acceptance of final payment shall constitute a full and final waiver of any and all claims by Subcontractor against Boldt, Owner and the Project arising out of the Subcontractor's Work or otherwise related to the Project except for outstanding change orders and claims submitted in writing by Subcontractor that are unresolved at the time of final payment. This waiver may not be modified by any restrictive endorsement, writing or other action or course of conduct of Subcontractor or Boldt but can only be modified by an express written amendment signed by both Boldt and Subcontractor.

### **Section 8. DRAWINGS, SUBMITTALS AND DAILY REPORTS.**

- a. Subcontractor shall carefully examine the specification requirements for information to be submitted for review such as shop drawings, data, schedules and samples (the "Submittals"). If required by Boldt, the Owner, the Architect or the General Contract, all Submittals shall be submitted electronically. Subcontractor shall submit such Submittals at its own expense and in such form as required by the Subcontract Documents in sufficient time to prevent any delay in the review of the Submittals or in the delivery and installation of any equipment or materials described in those Submittals. Subcontractor shall reimburse Boldt for all reasonable costs incurred by Boldt because of Subcontractor's failure to submit accurate and timely Submittals. Where a Submittal is required by the Subcontract Documents, and if any related work is performed by Subcontractor prior to Architect's review and acknowledgement that the Subcontractor's Work covered by the Submittal can proceed, will be at the sole risk, expense and responsibility of Subcontractor. If "in-place" or "as-built" drawings are required by the Subcontract Documents, these shall be prepared and submitted to Boldt before final payment is requested. Neither the delivery of the Submittals to Boldt nor Boldt's review of such Submittals shall constitute approval of any substitutions or alternates; it being understood that any such alternates or substitutions are only permitted with the express written consent of Owner and/or the Architect as provided by the General Contract and/or any procedures or requirements established by the Owner and/or the Architect. The Subcontractor shall not be relieved of the responsibility for errors or omissions in Submittals by Boldt's approval thereof.
- b. Unless waived in writing by Boldt, Subcontractor shall complete and submit to Boldt on a daily basis, a report of Subcontractor's Work for the preceding day, on the form attached to the Subcontract as Exhibit E.

### **Section 9. COMMENCEMENT, COMPLETION OF SUBCONTRACTOR'S WORK AND SUBCONTRACT TIME EXTENSIONS.**

- a. Time is of the essence of this Subcontract. Subcontractor agrees to supply materials, labor and equipment as necessary to commence Subcontractor's Work when directed by Boldt. Subcontractor shall diligently pursue the completion of Subcontractor's Work and coordinate Subcontractor's Work with the work being done on the Project by Boldt and other trades so that Subcontractor's Work and the work of others shall not be delayed or impaired by any act or omission of Subcontractor. Boldt shall determine the time, sequence and order in which the various portions of the work shall be installed and the priority of Subcontractor's Work and the work of other subcontractors and all matters representing the timely and orderly conduct of the Subcontractor's Work on the Project. Subcontractor acknowledges and understands that Subcontractor does not control the order, sequence or timing of the various portions of the Subcontractor's Work and Subcontractor waives any claim that the actual order, sequence or timing of the Subcontractor's Work was changed during the progress of the Project or is different than what the Subcontractor assumed or was told prior to commencement of the Subcontractor's Work. Boldt shall prepare a coordinated progress schedule (the "Schedule"), with input from the Subcontractor, for the benefit of Boldt and all subcontractors, including Subcontractor. Subcontractor shall promptly provide Boldt with such scheduling information as Boldt may request, including but not limited to weekly planned and actual expended man hours and installed units, provided however that nothing in this Subcontract shall imply that Subcontractor has any control over or right to approve the Schedule. Subcontractor agrees to perform the Subcontractor's Work in accordance with such Schedule (the "Subcontract Time"), as may be modified by Boldt as work progresses. Subcontractor will be required to participate in the weekly production meeting during any phase of the Project that involves or is impacted by Subcontractor's Work. Subcontractor's representatives attending the production meetings will

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have the authority and ability to make binding commitments regarding the timing of the performance of Subcontractor's Work.

- b. Should Subcontractor be obstructed or delayed in the prosecution or completion of Subcontractor's Work as a result of unforeseeable causes beyond the control of Subcontractor, including but not limited to acts of God or of the public enemy, acts of the government, fires, floods, epidemics, quarantine regulation, strikes or lockouts (not involving Subcontractor's employees or the employees of its sub-subcontractors or suppliers), and not due to Subcontractor's fault or neglect in whole or in part, Subcontractor shall notify Boldt in writing at least two (2) days before the deadline set within the General Contract for Boldt to give notice of the delay to the Owner, stating the cause or causes of the delay. If such notice is not given, Subcontractor shall be deemed to have waived any right that Subcontractor may have had to an extension of the Subcontract Time and, if permitted, additional compensation on account of such delay. Boldt will transmit Subcontractor's request to Owner or Owner's representative for an extension of time stating the cause of delay asserted by Subcontractor. Subcontractor shall only be entitled to such extensions of the Subcontract Time for completing the Subcontractor's Work as Owner or Owner's representative may grant, because of such unforeseeable cause. The decision of Owner or its representatives on Subcontractor's request for an extension of the Subcontract Time shall be final and conclusive upon Subcontractor, subject to the provisions of Section 19. If Boldt is not entitled under the General Contract to additional compensation as a result of a delay, then Subcontractor shall have no right to, and waives any claim for, additional compensation as a result of such delay.
- c. Except as expressly provided in this Section 9, Subcontractor shall not be entitled to any increase in the Subcontract Amount or any other monetary payment, reimbursement, or compensation over and above the Subcontract Amount for any delay for any reason, including but not limited to a delay in the commencement, prosecution, or completion of the Subcontractor's Work or for any interference, hindrance, or obstruction in the performance of the Subcontractor's Work. Subcontractor understands that this includes, but is not limited to claims for costs associated with overtime costs, loss of productivity, inefficiency, lost past or future profits, acceleration costs, consequential damages, lost opportunity costs, impact damages, or other similar claims for compensation, which arise out of or are caused by any delay in the progress of the Project or in the performance of the Subcontractor's Work from any cause or as a result of any extensions of the Subcontract Time, whether or not such delays are foreseeable.
- d. No interruption, cessation, postponement or delay in the commencement of the work in general or the Subcontractor's Work in particular or in the progress or sequence of either the work in general or Subcontractor's Work in particular, from any cause whatsoever, shall relieve Subcontractor of its duty to perform the Subcontractor's Work or give rise to any right to any claim for any loss, costs, damages, expenses or additional compensation by Subcontractor, except to the extent that any such loss, costs, damages, expenses or additional compensation is paid to Boldt by Owner for the account of Subcontractor as a result of such event. In any event, Subcontractor shall diligently proceed with the Subcontractor's Work as directed by Boldt.
- e. If the Subcontractor's Work includes installation of materials or equipment furnished by others, Subcontractor is responsible for exercising proper care in receiving, handling, storing, and installing such items. Subcontractor shall examine the items provided and report to Boldt any items that do not conform to the Subcontractor's Work. Subcontractor shall not proceed with installation of the nonconforming items without further instructions from Boldt.
- f. If the General Contract includes a provision that liquidated damages can be assessed by Owner, Subcontractor shall be liable for such portion of the liquidated damages assessed that arise from the act or omission of Subcontractor or any sub-subcontractor or supplier of Subcontractor.
- g. Should the Owner suspend the General Contract or any part of the work which includes the Subcontractor's Work, Boldt shall notify the Subcontractor in writing and upon receiving notification, the Subcontractor shall immediately suspend the Subcontractor's Work. In the event of Owner suspension, Boldt's liability to the Subcontractor shall be limited to the extent of Boldt's recovery on the Subcontractor's behalf under the Subcontract Documents. If Boldt agrees with

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Subcontractor's position, Boldt will cooperate with the Subcontractor, at the Subcontractor's expense, in the prosecution of any Subcontractor claim arising out of Owner's suspension of the Project.

### Section 10. CHANGES IN THE SUBCONTRACTOR'S WORK.

- a. Boldt shall have the right at any time during the progress of the work to change (increase or decrease) the Subcontractor's Work through a revision to the Subcontract ("Subcontract Revision"). Promptly after being notified of a proposed change by Boldt, Subcontractor shall submit an itemized estimate of any cost increases or savings Subcontractor foresees as a result of the proposed change. The failure to promptly provide such an estimate shall be deemed a waiver by Subcontractor of any claim for additional compensation associated with the proposed change in the Subcontractor's Work. If the proposed change decreases the Subcontractor's Work and the Subcontractor fails to submit an estimate, Boldt may prepare an estimate of the savings anticipated due to the change, which shall be binding on the Subcontractor. The parties expressly agree that, except in an emergency endangering life or property, no addition or change to the Subcontractor's Work shall be made except upon a Subcontract Revision or written order of Boldt. Boldt shall not be liable to Subcontractor for any extra labor, materials or equipment furnished without a Subcontract Revision or such written order. In the event of an emergency, the adjustment to the Subcontract Amount shall be determined in accordance with Subsection 10.d. below. No officer, employee or agent of Boldt is authorized to direct any change to Subcontractor's Work by verbal order.
- b. If Subcontractor believes that Subcontractor has been requested to perform work that is not included in Subcontractor's Work, Subcontractor shall give written notice to Boldt. This notice shall specifically identify the work that Subcontractor claims is not included in the Subcontractor's Work. This notice must be given prior to performing the work and not more than seven (7) calendar days after Subcontractor first determines that the work is not included in Subcontractor's Work. Boldt shall review the Subcontractor's notice and if Boldt agrees with the position of the Subcontractor, Boldt will issue written notice to Subcontractor and Subcontractor shall then provide an itemized estimate of any cost increases or savings Subcontractor foresees as a result of the change within a reasonable amount of time from the date of Boldt's notice so as to not delay the progress of the Project. Upon approval of the estimate by Boldt in writing, Subcontractor shall proceed with the changed work. The failure to provide such an estimate shall be deemed a waiver by Subcontractor of any claim for additional compensation associated with the proposed change in the Subcontractor's Work.
- c. Nothing in this Subcontract shall excuse Subcontractor from proceeding promptly with the prosecution of Subcontractor's Work (including any extra or changed work) as ordered in writing by Boldt and failure to do so shall constitute a breach of this Subcontract. Subcontractor shall promptly perform changes ordered in writing by Boldt even if the parties have not agreed on the amount of the adjustment to the Subcontract Amount as a result of such change.
- d. The Subcontract Amount shall be adjusted in the amount established by mutual agreement of Boldt and Subcontractor. In the event that Boldt and Subcontractor are unable to agree on the proper adjustment to the Subcontract Amount for a change, Subcontractor shall promptly perform said change, and the Subcontract Amount shall be adjusted as follows:
  1. For changes initiated by Owner, Architect or their representative, the Subcontract Amount shall be adjusted only in the amount approved by Owner for the change less the amount of Boldt's markup on said work. In no event shall Boldt be liable to Subcontractor for an amount greater than the amount received by Boldt from Owner for such change, less the amount of Boldt's markup on said work and nothing in the Subcontract Documents shall be construed in any way to reach any different determination. If Boldt agrees with Subcontractor's position, Boldt will cooperate with the Subcontractor, at the Subcontractor's expense, in the prosecution of any Subcontractor claim for insufficient payment by Owner of such change.
  2. For changes initiated by Boldt and not pursuant to a change by Owner or Architect, the Subcontract Amount shall be adjusted only by the amount of the increase or decrease of Subcontractor's direct labor and actual equipment, material and subcontract costs plus reasonable markup for overhead and profit as set forth in the

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Subcontract Documents. If a markup for overhead and profit is not set forth in the Subcontract Documents, the amount of the markup will not exceed the amount specified in the General Contract.

3. For work authorized in writing pursuant to Subsection 10.b. above, the Subcontract Amount shall be adjusted by the lesser of the approved estimate or the amount of the actual increase or decrease of Subcontractor's direct labor and actual equipment, material and sub-subcontract costs associated with the work.
- e. As soon as reasonably practical after the price has been determined under Subsection 10.d. and any additional requirements of the Owner for approval of the adjustment to the Subcontract Amount have been met, a Subcontract Revision in the form prescribed by Boldt shall be issued and executed by Subcontractor and Boldt. No payment will be due to Subcontractor for any change to Subcontractor's Work until Subcontractor executes the Subcontract Revision for the changed work, the requirements of the Owner for payment have been met, and payment has been received by Boldt from Owner for such changed work.
- f. If Subcontractor initiates a substitution, deviation or change in the Subcontractor's Work that is not permitted by the Subcontract and/or that causes expense to Boldt or other contractors or subcontractors, Subcontractor shall be liable for all costs and expenses arising from such substitution, deviation or change including overhead and profit markups of the parties impacted by Subcontractor's action.
- g. Subcontractor shall keep records of the actual labor, material, equipment rental and other costs associated with any changed work performed by Subcontractor (except work performed on a lump sum basis, unless required by General Contract) and shall provide copies of this information to Boldt upon request. In the event Subcontractor fails to keep such records, any dispute as to the amount of the adjustment to the Subcontract Amount shall be determined against the Subcontractor. Boldt shall have the right to review Subcontractor's books and records to verify the accuracy of Subcontractor's claim with respect to Subcontractor's costs associated with any change in the Subcontractor's Work. Subcontractor agrees to make such books and records available to Boldt's representative to perform such review upon reasonable notice during normal business hours.
- h. If the Owner is a tax-exempt entity and chooses to make direct purchases of materials and/or equipment tax free, Subcontractor will be required to provide a detailed list of all materials and equipment necessary for the Subcontractor's Work including their costs, with applicable sales and use taxes separately stated. In the event Owner makes such direct purchases, Subcontractor remains responsible for (i) selecting the materials and equipment, (ii) approving the purchase orders in writing, (iii) coordinating the acquisition and timely delivery of the materials and equipment so as to avoid delay in the progress of the Project, (iv) receiving, unloading and inspecting the materials and equipment for quality, damage and sufficiency for use, (v) assuring that Owner has the proper licenses or other rights necessary to possess and use the materials and equipment without additional cost or fee and (vi) installing the materials and equipment in compliance with the Subcontract Documents. Subcontractor will also review and, if appropriate, approve invoices from each material or equipment supplier furnishing direct purchases. If any directly purchased material or equipment fails within the warranty period specified for it under this Subcontract or the Subcontract Documents, Subcontractor shall correct, repair or replace the material or equipment in accordance with the warranty requirements of the Subcontract Documents and will hold Boldt and Owner harmless from any additional costs associated with such correction, repair or replacement. The indemnity obligations of Subcontractor under Section 13 below apply to Claims arising from direct purchase materials covered by this Subsection 10.h.

**Section 11. DEFECTIVE WORK AND CLAIMS.** Without in any manner waiving or limiting Boldt's other rights and remedies under this Subcontract and as provided by law, payments otherwise due Subcontractor may be withheld by Boldt on account of any of the following reasons: a breach of warranty or defect in Subcontractor's Work that has not been remedied promptly after notice of such breach or defect has been given; the filing of any claims, including but not limited to lien or bond claims by any sub-subcontractor (at any tier), supplier or laborer of Subcontractor or the reasonable evidence indicating the probability of the filing of any such claims; the failure of Subcontractor to make payments to its sub-subcontractors, suppliers or laborers; any failure

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of Subcontractor to perform its duties or obligations under this Subcontract; or a reasonable doubt that the Subcontractor's Work can be completed for the unpaid balance of the Subcontract Amount. If any of the reason(s) for withholding payment are not resolved promptly, Boldt may resolve the same at Subcontractor's expense. Subcontractor shall be responsible for all expenses and costs incurred by Boldt in resolving the reason(s) for withholding payment, including all reasonable attorney's fees and expenses incurred by Boldt in obtaining such resolution and in enforcing Boldt's rights against Subcontractor under this Section. Boldt may offset against any sums due, or to become due, to Subcontractor under this Subcontract, the amount of any liquidated or unliquidated obligations of Subcontractor to Boldt, whether or not arising from the Project. Notwithstanding the foregoing, Boldt shall not withhold payments otherwise due to Subcontractor in an amount in excess of one hundred fifty percent (150%) of the amount reasonably necessary to remedy the foregoing.

**Section 12. LIEN AND BOND CLAIMS.** Provided Subcontractor has been paid all undisputed amounts in a timely manner in accordance with the Subcontract Documents, Subcontractor will save and keep the Project free from any and all construction liens, mechanics liens or other liens or encumbrances of any type whatsoever and from all claims against any bond furnished by Boldt in connection with the Project that arise from Subcontractor's Work or from any labor, equipment, supplies, services, materials or other things furnished, provided or used in connection with the performance of Subcontractor's Work. If such a lien or bond claim is filed or asserted, Subcontractor shall take immediate action to discharge, remove or release such lien or bond claim at Subcontractor's cost. If Subcontractor fails to discharge, remove or release any such lien or bond claim, Boldt, in addition to all other rights and remedies under this Subcontract and as provided by law, may withhold sufficient funds out of any money due or that becomes due to Subcontractor, to pay the same and all costs and expenses incurred by Boldt as a result of such failure, including but not limited to reasonable attorney's fees, and pay from the funds withheld, the costs and expenses to resolve any such lien or bond claim. If the amount of such withheld funds is insufficient to pay all costs, expenses and fees, Subcontractor shall immediately pay the deficiency to Boldt.

### Section 13. INDEMNIFICATION AND INSURANCE.

a. Subcontractor agrees as follows:

1. To the fullest extent permitted by law, Subcontractor shall indemnify, defend, and hold harmless Boldt and Owner from and against each and every Claim, including any reasonable attorney's fees or expenses incurred by Owner or Boldt as a result of any Claim, that arises from the Subcontractor's performance of the Subcontractor's Work or the negligent acts or omissions or intentionally wrongful conduct of a Responsible Persons. This Section shall not be construed to obligate Subcontractor to indemnify Owner or Boldt for any portion of any liability determined to have been caused by the active negligence or willful misconduct of Owner or Boldt.
  - i. **"Claim"** means any and all claims, lawsuits, damages, losses, demands, judgments, expenses, liability or other obligation arising or alleged to have arisen out of bodily injury, personal injury or property damage (other than damage to the work itself).
  - ii. **"Responsible Persons"** means Subcontractor, its sub-subcontractors or suppliers, and their respective officers, directors, employees or agents and anyone for whose acts they may be liable.

Nothing in this Section shall be construed to negate or reduce any other rights or obligations of indemnity or defense that would otherwise exist as to any party or person indemnified by this Subsection 13.a. This indemnity obligation shall include, but not be limited to, a Claim brought by an employee of Subcontractor, by an employee of anyone for whose acts Subcontractor may be liable or by an employee of Boldt and/or Owner. In any and all claims against Boldt or Owner by an employee of any Responsible Persons, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit

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acts. Subcontractor's obligations under this Section apply regardless of any concurrent negligent act or omission of Owner or Boldt.

2. In addition to all other obligations of Subcontractor to indemnify, defend and hold harmless Boldt under this Subcontract and as required by law, if the General Contract contains additional obligations that require Boldt to indemnify, defend and hold harmless Owner and/or other persons or entities from any other claims, causes of action, defaults, liabilities, or other obligations (the "Owner Indemnity Claim"), Subcontractor agrees to indemnify, defend and hold harmless Boldt from and against any claims, lawsuits, damages, losses, demands, judgments, expenses, liability or other obligation arising from any Owner Indemnity Claim (and any reasonable attorney's fees or expenses incurred by Boldt as a result of any Owner Indemnity Claim and to enforce its rights against Subcontractor under this Subsection 13.a.2). If Boldt receives a demand to defend an Owner Indemnity Claim that arises in whole or in part from the acts or omissions of any Responsible Persons (as defined above), then upon written notice from Boldt, Subcontractor shall at its sole expense, defend Boldt and Owner and any other persons as required by the General Contract from and against such Owner Indemnity Claim. Regardless of the outcome of such Owner Indemnity Claim, Subcontractor shall not have the right to seek recovery of the legal and other defense fees and costs incurred by Subcontractor in defense of any Owner Indemnity Claim unless recovery is permitted by the General Contract.

- b. Subcontractor shall provide all insurance requirements set forth in Exhibit G.

### Section 14. COMPLIANCE WITH LAWS.

- a. Subcontractor agrees to comply, at its own expense, with all federal, state and local laws, statutes, ordinances, codes, rules and regulations applicable to the Subcontractor's Work, including but not limited to those dealing with taxation, worker's compensation, employment and safety as well as any safety rules or policies promulgated by Boldt or Owner in connection with the Project and Subcontractor agrees to indemnify, defend and hold harmless Boldt and Owner from any and all liability and damages, fines, costs and reasonable attorney's fees incurred by Boldt or Owner arising from Subcontractor's failure to comply with any such laws, statutes, ordinances, codes, rules and governmental regulations applicable to the Project or Subcontractor's Work.
- b. Subcontractor also agrees to indemnify, defend and hold Owner and Boldt harmless from and against any and all claims arising from any hazardous substances or materials which are brought on to the Project site by any Responsible Persons, or any contamination, spill or other condition requiring clean up, abatement or remediation caused by any act or omission of any Responsible Persons. This obligation to indemnify shall apply to losses of any nature whatsoever arising from any act or omission of any Responsible Persons, including, but not limited to, all costs, expenses, fees (including actual attorney's fees and expenses), fines, penalties, forfeitures and damages incurred by Owner or Boldt, costs of clean up, abatement or remediation, engineering costs, and damages due to any delay in completion of the Project.
- c. Subcontractor and all its sub-subcontractors shall comply with all employment laws applicable to their respective employees in general and that may be specifically applicable to employees working on the Project, including, but not limited to, fair employment laws, overtime, anti-discrimination and anti-harassment laws, affirmative action requirements and prevailing wage laws. Subcontractor shall be responsible for determining all action necessary to comply with all laws applicable to its employees and the employees of its sub-subcontractors working on the Project.
- d. Subcontractor acknowledges that it is responsible for assuring that violations of the employment laws do not occur with respect to its employees and the employees of its sub-subcontractors including, but not limited to, assuring that prohibited harassment of its employees, and the employees of its sub-subcontractors does not occur in the workplace or at the Project and that its employees and the employees of its sub-subcontractors do not harass other persons present in the workplace or at the Project. Subcontractor agrees to indemnify, defend and hold Boldt and Owner and their respective officers, directors, owners, employees or agents (the "Indemnified Parties") harmless from any claims, causes of action, suits,

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proceedings, investigations, damages, costs, expenses or fees, including reasonable attorney's fees and expenses, by any employee of Subcontractor or its sub-subcontractors alleging that any of the Indemnified Parties have violated any employment laws to the extent such claim arises from any act or omission of Subcontractor or any of its sub-subcontractors.

- e. Subcontractor agrees to submit a certification, acceptable to Boldt that its employees have presented the correct documents to legally work in the United States and shall indemnify, defend and hold Boldt and its Surety, and the Owner, harmless from any claims, liabilities including any damages resulting from work stoppages or delays arising from any Subcontractor noncompliance with any immigration laws.
- f. Subcontractor further agrees to reimburse Boldt for all costs and expenses, including reasonable attorney's fees, incurred to enforce the indemnity obligations in this Section 14.

**Section 15. CLEANUP.** Subcontractor agrees to keep the Project site clean at all times of debris arising out of the Subcontractor's Work and to comply with all written cleanup requirements established for the Project by the Owner and/or Boldt. If Subcontractor's debris is not removed from the Project site within two (2) working days after Boldt directs such removal, Boldt may elect to remove the debris in question and Subcontractor will be liable to Boldt for all expenses incurred by Boldt in connection with the removal effort.

**Section 16. PERMITS, LICENSES AND EASEMENTS.** All permits, (except the Project's main building permit) licenses and easements necessary for the prosecution of Subcontractor's Work shall be procured and paid for by Subcontractor. Subcontractor shall give all notices and comply with all laws, statutes, ordinances, codes, rules and regulations bearing on the performance of Subcontractor's Work. If Subcontractor discovers that Drawings or Specifications are at variance with any law, statute, ordinance, code, rule or regulation or that conflicts, discrepancies, errors or omissions exist within the Drawings, Specifications, bulletins or addenda, it shall promptly notify Boldt in writing of the discovery. If Subcontractor, after making such discovery, performs any work contrary to such laws, statutes, ordinances, codes, rules and regulations without such notice to Boldt, it shall bear all costs arising from such work, including any cost of correction and any reasonable attorney's fees or expenses incurred by Boldt.

### Section 17. FAILURE TO PERFORM AND TERMINATION FOR DEFAULT.

- a. If Subcontractor:
  - 1. fails or refuses to proceed with or to perform Subcontractor's Work as directed by Boldt, or
  - 2. fails or refuses to perform or abide by any terms, covenants, conditions or provisions contained in any of the Subcontract Documents, or
  - 3. fails or refuses to obey laws, statutes, ordinances, codes, regulations or other rules of conduct, or
  - 4. has a receiver or similar party appointed for its property, becomes insolvent, acknowledges its insolvency in any manner, ceases to do business, makes an assignment for the benefit of its creditors, or files a petition for bankruptcy.

Boldt shall have the right to declare the Subcontractor in default and immediately terminate this Subcontract on written notice to Subcontractor. The termination of this Subcontract will not release or waive any of Boldt's rights and remedies against the Subcontractor or Subcontractor's sureties and shall be without prejudice to any other right Boldt may be entitled to under this Subcontract and/or by law. Boldt may take possession of Subcontractor's Work and all materials, tools, equipment and appliances of Subcontractor that are necessary to complete the Subcontractor's Work or for which payment has been made, take assignment of all of Subcontractor's sub-subcontracts and purchase orders and complete Subcontractor's Work by whatever means, method or agency Boldt may, in its sole discretion, choose. All reasonable costs incurred, including all management, administrative and other direct and indirect expenses (including attorney's fees) incurred by Boldt to complete Subcontractor's Work and to enforce Boldt's rights under this Section (including the reasonable attorney's fees incurred to defend any claim asserted by the terminated Subcontractor) (collectively "Default Costs"), shall be set off and deducted from the Subcontract Amount, and if such Default Costs exceed the unpaid balance

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of the Subcontract Amount, Subcontractor agrees to pay promptly to Boldt, on demand, the full amount of such excess, including costs of collection, reasonable attorney's fees and interest at the maximum legal rate of interest until such excess is paid. Alternatively, Boldt can declare the Subcontractor in default and demand that Subcontractor take all necessary action to cure the default and pay all Default Costs. If Subcontractor has provided a Performance Bond, Subcontractor and Subcontractor's surety shall be liable under the Performance Bond in the event of default and take all necessary action to cure the default and pay all Default Costs regardless of whether Boldt elects to exercise its right to terminate the Subcontract due to Subcontractor's default. In the event of termination of this Subcontract under Section 17, Subcontractor agrees not to initiate any dispute resolution proceeding under this Subcontract or in any other forum until the Subcontractor's Work as defined by this Subcontract has been completed.

- b. In the event that Subcontractor's right to proceed has been terminated, Subcontractor agrees that it shall not be entitled to receive any further payment until after the Project has achieved Final Completion. If the Default Costs and amounts paid to Subcontractor prior to termination are less than the Subcontract Amount, Subcontractor will be paid for Subcontractor's Work properly completed prior to termination equal to the difference between (i.) the Subcontract Amount and (ii.) the sum of the Default Costs and amount paid to Subcontractor prior to termination.
- c. Boldt's determination of Subcontractor's default or defaults, made by Boldt in good faith under the belief that a default or defaults existed under the terms of the Subcontract shall be conclusive as to Boldt's right to proceed as set forth in Subsection 17.a. above. The liability of Subcontractor hereunder shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained and obligations assumed by Boldt in good faith under the belief that such amounts were necessary or required to remedy such failure or refusal and/or to complete Subcontractor's Work, including but not limited to providing the labor, materials, equipment, supplies and other items reasonably necessary to do so and/or awarding subcontracts and/or purchase orders to one or more third parties to complete all or a portion of the Subcontractor's Work; and to settle, discharge or compromise any claims, demands, suits and judgments pertaining to or arising out of the Subcontractor's Work. A sworn, itemized statement of these sums paid, expenses and losses incurred, damages sustained, and obligations assumed, together with such supporting documents as Boldt shall deem to be reasonable and appropriate shall be prima facie evidence of the fact and extent of Subcontractor's liability.
- d. If after notice of termination of Subcontractor's right to proceed pursuant to this Section 17, it is determined for any reason that Subcontractor was not in default or that its delays were excusable or that Boldt was not entitled to the remedies against Subcontractor under this Section 17, then Subcontractor's remedies against Boldt shall be the same as and limited to those afforded Subcontractor under Section 18, Termination for Convenience.
- e. If the General Contract between Boldt and Owner is terminated prior to Final Completion, Subcontractor, upon being notified by Boldt of such termination, shall immediately cease further work under this Subcontract. Subcontractor shall not be entitled to any further compensation for its work or costs associated with the Project after such notice is given except to the extent that the Owner pays to Boldt additional sums for the account of Subcontractor and then only in the amount of such payment.

**Section 18. TERMINATION FOR CONVENIENCE.** Boldt may terminate this Subcontract without cause upon two (2) calendar days' written notice to Subcontractor. In the event of such termination for convenience, Subcontractor's recovery against Boldt shall be limited to that portion of the Subcontractor's Work actually completed as of the date of termination, together with any retainage withheld, and Subcontractor shall not be entitled to any further recovery against Boldt, including, but not limited to, anticipated profit on work not performed. In calculating the portion of the Subcontractor's Work actually completed the parties will consider the extent of the remaining work and the cost to perform it, along with the records that show the work actually completed to date and the reasonable value of that work, provided however, that nothing in this Section 18 shall be construed to determine the portion of the Subcontractor's Work on a time and material basis or on the basis of actual costs incurred. In making such calculation, the estimated percentage of work completed as reflected on a Schedule of Values or elsewhere may be considered, but greater weight shall be given to the actual costs incurred to complete the Subcontractor's Work.



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### Section 19. DISPUTE RESOLUTION.

- a. If a dispute or claim arises between Boldt and Subcontractor, the Project representatives of Boldt and Subcontractor shall attempt to negotiate a resolution of the dispute or claim. If the Project representatives of Boldt and Subcontractor are unable to negotiate a resolution of any dispute or claim, the dispute or claim shall be referred to a member of senior management of Boldt and Subcontractor and they shall attempt to negotiate a resolution. If such resolution is not reached within a reasonable amount of time, not to exceed thirty (30) calendar days from the date the dispute is referred to senior management or such longer period as the parties may agree, the dispute or claim shall be referred to non-binding mediation before a mediator selected by mutual agreement of the parties. If the parties are not able to select a mediator by mutual agreement within twenty (20) calendar days after senior management concludes its negotiations, the mediator shall be selected in accordance with the mediation rules and procedures of JAMS/Endispute (or its successor). The parties shall each pay one-half of the mediator fees and expenses.
- b. If the matter is unresolved after submission of the matter to a mitigation procedure or mediation, the parties shall submit the matter to litigation in either the state or federal court having jurisdiction over of the matter in the location of the Project.
- c. Each of the parties hereby waives to the fullest extent permitted by applicable law any right it may have to a trial by jury with respect to any court proceeding directly or indirectly arising out of and permitted under or in connection with this Subcontract, the performance of Subcontractor's Work or the transactions contemplated by this Subcontract.
- d. For claims by or against Subcontractor which involve the correlative rights, duties, and obligations of Boldt against Owner, Subcontractor expressly agrees that any action or proceeding against Boldt shall be brought in the location and manner specified in the General Contract, subject to Subsection 19.b. above. If arbitration or litigation is conducted by Owner and Boldt concerning any dispute between them which likewise involves an issue in dispute between Boldt and Subcontractor, then Subcontractor, if permitted by the arbitrators or the court shall be a named party. Even if Subcontractor is not a named party, Subcontractor agrees to participate and be bound by the results of any such proceeding as it relates to Subcontractor's claim to the same extent Boldt is bound to Owner under the General Contract. Subcontractor also expressly agrees that any action or proceeding commenced by Subcontractor shall be stayed pending the completion of related proceedings between Owner and Boldt. Boldt's determination of whether any issue in dispute between Boldt and Subcontractor likewise involves an issue in dispute between Boldt and Owner shall be determinative of Subcontractor's obligation to participate and be bound by the dispute resolution proceedings between Boldt and Owner.
- e. The existence of a dispute or controversy shall not be grounds for any nonperformance by Subcontractor or limit any rights or remedies of Boldt under this Subcontract, including the right to proceed to remedy any breach, default or refusal to perform by Subcontractor.
- f. In no event shall any litigation or arbitration be commenced after the date when institution of legal or equitable proceedings based upon such claim, dispute or other matter in question would be barred by the applicable statute of limitations.
- g. Boldt's surety on any payment bond shall be entitled to all of the rights afforded Boldt under this Section 19. Subcontractor's surety on any performance bond issued by Subcontractor agrees to participate and be bound by all dispute resolution proceedings under this Section 19.

**Section 20. WARRANTY.** Subcontractor shall, before requesting final payment, provide the warranty required by the Subcontract Documents, including but not limited to the Warranty of Construction attached as Exhibit D. In the absence of any specific warranty applicable to Subcontractor's Work (in whole or in part) required by the General Contract, Subcontractor, in signing this Subcontract, agrees at its own expense to replace or repair any faulty or defective material or workmanship which appears within one (1) year from the date of substantial completion as determined by Owner for the entire Project, or the date of

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Owner's beneficial occupancy of the Project, whichever occurs later; provided, however, that the warranty shall run no less than one (1) year beyond the date on which Subcontractor performs its last work under this Subcontract. In addition, Subcontractor shall be responsible for and pay for replacement or repair of adjacent materials or work which may be damaged as a result of such replacement or repair, and any incidental or consequential damages arising from such faulty or defective material or workmanship.

### Section 21. USE OF BOLDT'S EQUIPMENT OR EMPLOYEES.

- a. In the event Subcontractor uses Boldt's equipment, tools or facilities, Subcontractor shall reimburse Boldt's current published rates unless otherwise agreed in writing, plus the cost of all operating labor provided by Boldt in connection with the equipment and a reasonable markup for overhead and profit. Subcontractor will be responsible during the entire term of its use of Boldt's equipment, tools or facilities for the cost of all operating expenses and the care, maintenance, and usage of the above equipment, tools and/or facilities in accordance with all OSHA requirements and agrees to repair or replace the equipment, tools and/or facilities with equipment, tools and/or facilities of like kind and quality if such equipment, tools and/or facilities are damaged or destroyed from any cause while in Subcontractor's care, custody, or control. Further, in so doing, Subcontractor assumes all responsibility for and shall indemnify, defend and hold Boldt harmless for any claims, actions, damages, liabilities or expenses, including reasonable attorney's fees of any type or nature whatsoever resulting from the use of such equipment, tools or facilities by Subcontractor or its agents, employees or permittees.
- b. In the event that Subcontractor uses any employees of Boldt, they shall, while engaged to assist in performing Subcontractor's Work, be considered for all purposes as employees, servants and agents of Subcontractor and not of Boldt, irrespective of who pays them. Subcontractor shall indemnify, defend and hold harmless Owner and Boldt from and against any and all loss, cost, liability, damage and expense, by reason of any act or omission of any employee, servant or agent of Subcontractor, including those, if any, originally employed by Boldt and utilized by Subcontractor. Subcontractor further agrees to defend, at Subcontractor's own expense, any suit or suits that may be brought against Owner or Boldt by reason of any act or omission of any employee, servant or agent of Subcontractor, including those, if any, originally employed by Boldt and utilized by Subcontractor.
- c. Subcontractor further agrees to reimburse Boldt for all costs and expenses, including attorney's fees, incurred to enforce the indemnity obligations under Section 20.
- d. Notwithstanding the foregoing, the terms of this Section 21 shall not apply to the use of Boldt's employee(s) in the event that Subcontractor retains Boldt under separate sub-subcontract agreement.

### Section 22. SAFETY.

- a. Subcontractor agrees to comply with all applicable laws, statutes, codes, regulations and standards regarding safety and with any safety plan or program established by the Owner and/or Boldt for the Project, provided however that Subcontractor shall at all times be solely responsible for safely performing Subcontractor's Work. Subcontractor shall establish, maintain and implement its own safety program for its employees and its visitors and others working at or around any areas in which Subcontractor's Work is being performed. Subcontractor's safety program shall, at a minimum, meet all legal requirements and the requirements of any safety plan established by the Owner and/or Boldt. In the event of conflict within or between the foregoing, the Subcontractor shall meet the more stringent requirement. A copy of the Subcontractor's safety plan shall at all times be maintained at the Project site. In addition, Subcontractor shall hold safety meetings at the Project site at such intervals as may be specified by Boldt on such topics as may be pertinent to the work being performed at the Project.
- b. Subcontractor shall immediately verbally report to Boldt the occurrence of any Claim, incident or accident. Subcontractor shall promptly submit as directed by Boldt, a full report regarding any accident, incident or Claim, arising out of any

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injuries to its employees or those of any firm or individual to whom it may have subcontracted work, or any property damages arising or alleged to have arisen from any act or omission of Subcontractor.

- c. The Subcontractor agrees to provide an alcohol and drug-free working environment to protect the safety, health and property of the Owner, Boldt and employees of other contractors and subcontractors with whom the Subcontractor is working and the general public. The sale, distribution, consumption, use of or being under the influence of alcohol or controlled substances is prohibited on the Project site. Any employee found using, possessing, selling, distributing, concealing or transporting any alcohol or controlled substance shall be removed from the Project site and shall be prohibited from performing work at the Project site for the duration of the Project. Unless restricted by law, Boldt reserves the right to require that Subcontractor conduct alcohol and drug testing of all employees and agents of Subcontractor assigned to work on the Project prior to commencement of work by Subcontractor's employees or agents. In addition, such testing may be conducted during the progress of the Project in the event of reasonable suspicion that Subcontractor's employee or agent is under the influence of drugs or alcohol or in the case of an accident or near accident and upon such other terms as the Owner may establish, including but not limited to random testing.
- d. If the General Contract imposes any limitation on employees who may work on the Project or requires that employees undergo a background check and/or drug testing as a condition of working on the Project, Subcontractor agrees, to the extent permitted by applicable law, to comply with these requirements or limitations at Subcontractor's expense.

**Section 23. OWNER'S PREMISES/PROPERTY.** Subcontractor and its employees, agents, sub-subcontractors and suppliers shall limit their activities to those areas expressly designated for their use and shall not be present in any other areas of the Owner's property, including but not limited to restrooms and vending or cafeteria areas, without prior notice to and written consent from Boldt. Subcontractor further agrees that its employees, agents and visitors will only park in areas designated for such purpose. Subcontractor and its employees, agents, sub-subcontractors and suppliers shall not use any tools, equipment, services or facilities of Owner, without prior notice and written consent from Owner and Boldt.

**Section 24. QUALITY OF WORKERS.** Subcontractor shall provide supervision and workers of a quality commensurate with the usual requirements for the type of work being done and shall have a superintendent or other designated individual capable of understanding instructions and communicating with Boldt, Owner and other subcontractors whenever Subcontractor's Work is being performed on the Project site. Subcontractor shall also provide a sufficient number of qualified workers to maintain the schedule and not delay Boldt or other subcontractors, trades or suppliers. If, in the opinion of Boldt, Subcontractor has not provided a sufficient number of qualified workers to maintain the Schedule, Boldt may, on two (2) working days written notice to Subcontractor, supplement Subcontractor's workforce and deduct the cost of such supplemental workforce from any amounts due or to become due to Subcontractor, together with all cost and expenses incurred by Boldt to provide such supplemental workforce and any costs, expenses and fees (including reasonable attorney's fees) incurred to enforce the rights under this Section 24. In addition, if, in Boldt's opinion, any of Subcontractor's personnel are not satisfactorily performing their work, Boldt shall notify Subcontractor, and Subcontractor shall, within two (2) working days of such notice, initiate the necessary steps to remove the disapproved personnel and replace them with personnel acceptable to Boldt.

**Section 25. JURISDICTIONAL DISPUTES AND LABOR PROBLEMS.** Subcontractor shall supply only labor and/or materials that will not cause labor disputes that impact the overall performance of the work on the Project. In the event Subcontractor's workers (a) are involved in a jurisdictional dispute with other crafts on the Project, or (b) refuse to provide proper and timely services due to any other type of labor dispute, or (c) participate or engage in a strike, work stoppage, slowdown, or picket line for any reason, Subcontractor agrees to take immediate steps to resolve the cause or basis for such dispute, strike, work stoppage, slowdown, or picket. Failure to resolve such dispute, strike, work stoppage, slowdown, or picket immediately shall be deemed a default under this Subcontract.

**Section 26. CLAIMS BY OR AGAINST SUPPLIERS OR OTHER SUBCONTRACTORS.** Should Subcontractor have a claim against Boldt or any other subcontractor or supplier of Boldt on the Project by reason of the acts or omissions of such other subcontractor or supplier, then Subcontractor shall make claim directly against such other subcontractor or supplier. To the extent

necessary to pursue such claim, this Section 26 shall operate to allow Subcontractor to pursue any claims and rights of Subcontractor against such other subcontractor or supplier for the limited and express purpose of pursuing Subcontractor's claim. Nothing in this Section 26 shall limit or preclude Boldt from pursuing any rights, remedies or claims of Boldt against such other subcontractor or supplier. Subcontractor agrees to make no direct claim against Boldt and expressly waives all rights against Boldt for any loss or expense that is or may reasonably be attributed to the act or omission of another subcontractor or supplier.

#### **Section 27. MISCELLANEOUS.**

- a. Subcontractor shall not assign or subcontract this Subcontract in whole or in part, or any right, title or interest in it, without the advance written consent of Boldt. If Subcontractor subcontracts any portion of the Subcontractor's Work, Subcontractor shall require that its sub-subcontractor be bound to this Subcontract and assume toward Subcontractor all of the obligations and responsibilities that Subcontractor has assumed toward Boldt. Even if Boldt consents to such assignment or subcontract, Subcontractor shall, at all times and in all circumstances, remain liable to Boldt for the performance of all obligations made pursuant to this Subcontract. Boldt may assign its rights and obligations to Boldt's surety, Owner, Owner's lender or such other third party, as any of them shall designate.
- b. Boldt's assignment of this Subcontract to the Owner, as provided in the General Contract, is effective as provided by the General Contract. Subcontractor consents to such assignment and agrees to be bound to the assignee by the terms of this Subcontract, provided that the assignee fulfills the obligations of Boldt.
- c. If this Subcontract and/or the Subcontractor are subject to approval by Architect and/or Owner under the terms of the General Contract, Boldt shall have no obligation whatsoever to Subcontractor unless and until such approval is obtained.
- d. Unless specifically noted within Section 3, Project Specific Provisions, there are no performance and payment bond requirements at this time. Boldt reserves the right to require performance and/or payment bonds from Subcontractor at any time in the amount of 100% of the Subcontract Amount. If these bonds are required after this Subcontract has been signed, a Subcontract Revision will be issued for the cost of the bonds.
- e. Subcontractor agrees to abide by all Project site access rules, procedures, or other Owner or Boldt requirements. Subcontractor agrees that its materials, equipment, tools and machinery shall only be stored in areas designated for such purpose by Boldt. If Subcontractor or its employees cause any loss or damage to the work or materials of Boldt, Owner, Owner's separate contractors or any other subcontractor, Subcontractor shall be charged with such loss or damage, and any costs incurred to correct such loss or damage shall be deducted from monies due Subcontractor. Subcontractor further agrees to reimburse Boldt for all costs and expenses, including reasonable attorney's fees, incurred to enforce the obligations in this Subsection 27.e.
- f. Subject to Subsection 27.a. above, this Subcontract shall be binding upon and shall insure to the benefit of the successors and assigns of the parties.
- g. This Subcontract shall be governed by the laws of the state in which the Project is located.
- h. Either party's failure to enforce any provisions of this Subcontract does not constitute a waiver of that party's right to subsequently enforce each and every such provision of this Subcontract.
- i. Each of the parties to this Subcontract agrees and represents that it represents the full and entire agreement between the parties regarding its terms and conditions, that no other agreement or understanding of any nature exists concerning its terms and conditions, and that all negotiations, understandings or agreements, whether oral or written, made prior to the execution of the Subcontract shall be deemed merged in, integrated into and superseded by this Subcontract. Subcontractor acknowledges that by signing this Subcontract, Subcontractor has read and understands the Subcontract. This Subcontract may not be modified, amended or altered in any manner except by written amendment signed by both Subcontractor and Boldt.
- j. All indemnification obligations under this Subcontract, including, but not limited to, the obligations under Sections 11, 12, 13, 14, 16, 17, 21, and Subsection 27.b. shall survive the making of final payment, the termination of this Subcontract and completion of Subcontractor's Work.

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Date: \_\_\_\_\_

Contact Person: \_\_\_\_\_

- k. The provisions of this Subcontract shall not be interpreted or construed for or against either party, regardless of which party may have drafted this Subcontract or any specific provision of it. The parties acknowledge that they have mutually negotiated and reviewed all provisions of this Subcontract and that it was not drafted solely by either party.
- l. If any section, clause or provision of the Subcontract is found unenforceable by a court or arbitrator with competent jurisdiction, the section, clause or provision deemed unenforceable shall be severed from this Subcontract to the minimum extent necessary to cause such section, clause or provision to be deemed enforceable. Such determination shall not affect any other section, clause or provision of the Subcontract and the balance of the Subcontract shall remain fully enforceable and in full force and effect.
- m. If the General Contract includes a provision that consequential damages can be assessed by Owner, Subcontractor shall be liable for such portion of damages assessed that arise from the act or omission of Subcontractor or any sub-subcontractor or supplier of Subcontractor. In the absence of such provision, Boldt and the Subcontractor mutually waive all claims against each other for consequential damages, including damages for loss of business, loss of financing related to the Project, loss of profits not related to this Project, loss of bonding capacity, loss of reputation, or insolvency. Similarly, the Subcontractor shall obtain in another agreement from its sub-subcontractors mutual waivers of consequential damages that correspond to the Subcontractor's waiver of consequential damages herein. The provisions of this Subsection 27.m. shall also apply to and survive termination of this Subcontract.
- n. Subcontractor shall treat as confidential and not disclose to third persons except as is necessary for the performance of the Subcontractor's Work or as required by law or use for its own benefit any of Owner's or Boldt's confidential information that may be disclosed to the Subcontractor or which the Subcontractor may acquire in connection with the Subcontractor's Work. To the extent the General Contract provides for the confidentiality of any of the Owner's proprietary or otherwise confidential information disclosed in connection with the performance of this Subcontract, Subcontractor is equally bound by the Owner's confidentiality requirements.
- o. Subcontractor shall not use publicly for publicity, promotion or otherwise, any logo, name, trade name, trademark of Boldt or Owner or any of their affiliates affiliations (which include entities controlled by Boldt or Owner or by subsidiaries of Boldt or Owner), including, but not limited to, the terms of The Boldt Company, Boldt, Boldt Construction, or any simulation, abbreviation or adaptation of the same, or the name of any employee or agent of Boldt, Owner or their affiliates, without the written consent of Boldt and Owner, if applicable. Boldt and Owner may withhold such consent in their absolute discretion. Violation of this Subsection shall constitute a material breach of this Subcontract.
- p. Subcontractor shall, within five (5) working days of Boldt's request, provide to Boldt any and all information required as part of Boldt's ongoing subcontractor prequalification program.
- q. Subcontractor agrees to abide by the provisions of the following related to equal employment opportunity, to the extent applicable, which are incorporated herein by reference: 41 C.F.R. §§ 60-1.4(a), 60-300.5(a), 60-741.5(a), 61-300.10, Executive Orders 11246, 13465, and 13672. **As applicable, Boldt and Subcontractor shall abide by the requirements of 41 CFR § 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified individuals with disabilities. Boldt and Subcontractor shall abide by the requirements of 41 CFR § 60-300.5(a). This regulation prohibits discrimination against qualified protected veterans and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans.**

**Section 28. EXHIBITS INCORPORATED.** The following Exhibits will be executed and delivered in a timely manner by Subcontractor as necessary in the performance of Subcontractor's Work and the administration of this Subcontract and are expressly agreed to be a part of this Subcontract and binding upon the parties:

**Subcontract Agreement**

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**Date:** \_\_\_\_\_

**Contact Person:** \_\_\_\_\_

- Exhibit A: Application for Payment
- Exhibit B: Partial Release and Waiver of Liens
- Exhibit C: Final Release and Waiver of Liens
- Exhibit D: Warranty of Construction
- Exhibit E: Subcontractor's Daily Report
- Exhibit F: List of Sub-Subcontractors, Suppliers and Benefit Funds
- Exhibit G: Minimum Insurance Requirements

**IN WITNESS WHEREOF**, the parties have executed this Subcontract as of the date written above.

**SUBCONTRACTOR:**

**Signature:** \_\_\_\_\_

**Name and Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**THE BOLDT COMPANY:**

**Signature:** \_\_\_\_\_

**Name and Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_

### SUBCONTRACTOR’S APPLICATION FOR PAYMENT

**TO: The Boldt Company (“Boldt”)**

**FROM: \_\_\_\_\_ (“Subcontractor”)**

**PROJECT DESCRIPTION: \_\_\_\_\_**

APPLICATION FOR PAYMENT NO.: \_\_\_\_\_

Period \_\_\_\_\_ to \_\_\_\_\_

**STATEMENT OF SUBCONTRACT:**

- 1. Original Subcontract Amount..... \$ \_\_\_\_\_.
- 2. Approved Subcontract Revision Numbers  
\_\_\_\_\_ (as per attached breakdown)..... \$ \_\_\_\_\_.
- 3. Adjusted Subcontract Amount..... \$ \_\_\_\_\_.
- 4. Value of Work Completed to Date..... \$ \_\_\_\_\_.
- 5. Less Amount Retained ( \_\_\_\_\_ % )..... \$ \_\_\_\_\_.
- 6. Total Less Retainage..... \$ \_\_\_\_\_.
- 7. Total Previously Certified (Deduct)..... \$ \_\_\_\_\_.
- 8. AMOUNT DUE THIS REQUEST..... \$ \_\_\_\_\_.

Subcontractor certifies that the labor and/or services provided and the materials supplied by Subcontractor to date, as shown above, represent the actual value of the Subcontractor’s Work performed under the terms and conditions of the Subcontract and all accepted Subcontract Revisions between Subcontractor and Boldt relating to the Project and, further, that Subcontractor has no basis in events occurring before the date of this Application to claim any additions to the Subcontract Amount except as set forth in a written notice expressly given to Boldt by Subcontractor for that purpose. Further, Subcontractor, upon payment of the amount approved by Owner for this Application, waives all of its lien rights, if any, bond claim rights, if any or other claims for any work included in this or any preceding Applications for Payment, except for retainage currently being withheld by Boldt. Subcontractor understands and agrees that the final determination of the amount to be paid on this Application is made by Owner and not by Boldt and that the submission of this Application by Boldt is not a warranty or representation of any amount due to Subcontractor.

Subcontractor also certifies that payments, less applicable retainage, have been made through the period covered by previous payments received from Boldt (1) to all sub-subcontractors and suppliers and (2) for all materials and labor used in, or in connection with, the performance of the Subcontract. Subcontractor has complied with federal, state and local tax laws, employment laws, or wage and hours laws, including social security laws, unemployment compensation laws, prevailing wage laws and worker’s compensation laws applicable to the performance of the Subcontract.

**SUBCONTRACTOR:**

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_

WITNESS: \_\_\_\_\_

**For Boldt Use Only**

Inv. Amt. _____
Disc. _____
R/P _____
Ded’n _____
Net Amt. _____

**SUBCONTRACTOR’S PARTIAL RELEASE AND WAIVER OF LIENS**

Upon receipt of payment from The Boldt Company (“Boldt”) of the sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), by \_\_\_\_\_ (“Subcontractor”), on account of its Subcontract with Boldt dated \_\_\_\_\_ (“Subcontract”), for Subcontractor’s Work (as defined in the Subcontract) for the Project owned by \_\_\_\_\_ (“Owner”) located at \_\_\_\_\_ and in consideration of this payment and all prior payments, Subcontractor waives, releases, relinquishes and forever discharges Owner and the Project for any and all liens, claims and causes of action of any kind or character through the date of this Release and Waiver of Liens arising from any and all work performed directly or indirectly by Subcontractor through the date of this Release and Waiver of Liens and any and all claims, demands and liens of every kind and character whatsoever that Subcontractor has against Boldt, Owner and the Project as of the date of this Release and Waiver of Liens.

The undersigned further warrants and represents that Subcontractor has paid all amounts due through the date of this Release and Waiver of Liens to all sub-subcontractors, suppliers, laborers that have provided services, materials or labor in connection with the Subcontract for the Project.

SUBCONTRACTOR:

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_

THE STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Personally appeared before me this \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, the above-named \_\_\_\_\_, the duly authorized employee of Subcontractor, known to me to be the person who executed this instrument, and who acknowledged to me that he/she did so for the purposes and consideration set forth in it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this \_\_\_\_\_ day of \_\_\_\_\_.

SEAL

\_\_\_\_\_  
NOTARY PUBLIC

\_\_\_\_\_  
MY TERM EXPIRES



**SUBCONTRACTOR’S FINAL RELEASE AND WAIVER OF LIENS**

Upon receipt of payment from The Boldt Company (“Boldt”) of the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), being the final payment due to \_\_\_\_\_ (“Subcontractor”), on account of its Subcontract with Boldt dated \_\_\_\_\_ (“Subcontract”), for the Subcontractor’s Work (as defined in the Subcontract) for the Project owned by \_\_\_\_\_ (“Owner”) located at \_\_\_\_\_ and in consideration of this payment and prior payments, Subcontractor waives, releases, relinquishes and forever discharges (i) any and all lien rights of any kind or character, (ii) Boldt from any and all fees, costs, expenses, obligations and liabilities arising out of or related to the Subcontract, (iii) any claims for an increase in the Subcontract Amount for any work performed by Subcontractor (regardless of whether such work is included in the Subcontractor’s Work or is additional work or extra work not included in the Subcontractor’s Work), (iv) any claims for additional payment or compensation of any kind, (v) any and all claims and demands of every kind and character whatsoever that Subcontractor has against Boldt, Owner and the Project, (vi) any claims against any payment bond furnished by Boldt in connection with the Project and (vii) any and all claims in any way relating to the Subcontract and/or the Project.

SUBCONTRACTOR:

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_

THE STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Personally appeared before me this \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, the above-named \_\_\_\_\_, the duly authorized employee of Subcontractor, known to me to be the person who executed this instrument, and who acknowledged to me that he/she had done so for the purposes and consideration set forth in it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this \_\_\_\_\_ day of \_\_\_\_\_.

SEAL

\_\_\_\_\_  
NOTARY PUBLIC

\_\_\_\_\_  
MY TERM EXPIRES

### SUBCONTRACTOR’S WARRANTY OF CONSTRUCTION

Pursuant to the General Contract between The Boldt Company also known as, Oscar J. Boldt Construction Co., a Wisconsin Corporation (“Boldt”) and \_\_\_\_\_ (“Owner”), dated \_\_\_\_\_, for the construction of the Project (as defined in the Subcontract); and the Subcontract between \_\_\_\_\_ (“Subcontractor”) and Boldt dated \_\_\_\_\_ (the “Subcontract”), Subcontractor guarantees and warrants all Subcontractor’s Work shall conform to the Subcontract Documents and shall be free from any defect of material and/or workmanship for the period required by the Subcontract Documents. Subcontractor shall repair or replace any non-conforming or defective work as provided by the Subcontract Documents.

All manufacturers’ and suppliers’ warranties and guarantees, express or implied, respecting any part of Subcontractor’s Work and on any materials and equipment furnished under the Subcontract are assigned by Subcontractor jointly to Boldt and Owner. This Warranty of Construction shall supplement, and not supersede or amend, (i) any warranties and guarantees given by Subcontractor under the terms of the Subcontract Documents or (ii) any warranties and guarantees given by any manufacturer or supplier of any materials or equipment furnished by Subcontractor under the Subcontract Documents.

SUBCONTRACTOR:

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_

Person to contact in case of emergency:

Name \_\_\_\_\_ Phone No. \_\_\_\_\_

### SUBCONTRACTOR'S DAILY REPORT

TO: THE BOLDT COMPANY

DATE \_\_\_\_\_

FROM: \_\_\_\_\_

SUPERINTENDENT \_\_\_\_\_

FOREMAN \_\_\_\_\_

JOURNEYMEN \_\_\_\_\_

OWNER: \_\_\_\_\_

APPRENTICES \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

LABORERS \_\_\_\_\_

HELPERS \_\_\_\_\_

PREPARE DAILY FOR THAT DAY'S WORK; SUBMIT TO BOLDT JOB SUPERINTENDENT BY 8:00 A.M. NEXT WORKING DAY

OTHERS \_\_\_\_\_

TOTAL \_\_\_\_\_

DESCRIPTION OF WORK PERFORMED TODAY (give description, amount accomplished and location): \_\_\_\_\_

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REMARKS (explain accidents, reasons for delay, visitors, etc.): \_\_\_\_\_

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NOTE: SEND A COPY OF THIS REPORT TO YOUR HOME OFFICE.

\_\_\_\_\_  
SUPERINTENDENT OR FOREMAN

### SUBCONTRACTOR’S LIST OF SUB-SUBCONTRACTORS, SUPPLIERS AND BENEFIT FUNDS

The undersigned duly authorized representative of \_\_\_\_\_ (“Subcontractor”) being first duly sworn on oath states as follows:

- 1. That as of the date of execution of the Subcontract No. \_\_\_\_, Subcontractor anticipates using the following sub-subcontractors and suppliers in connection with the Project (as defined in the Subcontract):

Sub-subcontractor/Supplier Name and Contact Information	Sub-subcontract/Purchase Order Amount

\*Attach additional sheet, if necessary.

- 2. Subcontractor will employ employees in connection with the Project on whose behalf payments will be required to be made to the following union benefit funds (if none, write none):
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
- 3. That the list of subcontractors, suppliers and union benefit funds identified above is true, correct and complete.
- 4. In the event of any changes, additions or deletions to this list, the undersigned will notify **Boldt in writing** within five (5) business days of the change, addition or deletion.

SUBCONTRACTOR:

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_

THE STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Personally appeared before me this \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, the above-named \_\_\_\_\_, the duly authorized employee of Subcontractor, known to me to be the person who executed this instrument, and who acknowledged to me that he/she did so for the purposes and consideration set forth in it.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this \_\_\_\_\_ day of \_\_\_\_\_.

SEAL

\_\_\_\_\_  
NOTARY PUBLIC

\_\_\_\_\_  
MY TERM EXPIRES

**Exhibit G: Minimum Insurance Requirements.**

1. **A certificate of insurance must be furnished to Boldt before commencement of Subcontractor's Work pursuant to any issued Subcontract and before any funds are paid to Subcontractor under the Subcontract.**
  
2. The insurance requirements outlined in this Exhibit are in addition to and separate from any other requirements in the General Contract applicable to the Subcontractor. The liability of Subcontractor shall not be limited by the type, amount or limits of any insurance maintained by Subcontractor. Unless higher limits are required by Boldt or by the General Contract, Subcontractor shall procure, maintain during the term of the Subcontract (and, in the case of completed operations coverage, for two (2) years after the date of Final Completion or such longer period as may be required under the General Contract) and pay for, and shall require its sub-subcontractors to procure, maintain during the progress of their portion of the work (and, in the case of completed operations coverage, for two (2) years after the date of Final Completion or such longer period as may be required under the General Contract), and pay for the following types and minimum amounts of insurance:
  - a. Commercial General Liability Insurance\*:
    - i. \$4,000,000 Each Occurrence
    - ii. \$4,000,000 General Aggregate Per Project
    - iii. \$4,000,000 Products/Completed Operations Aggregate.
    - iv. \$4,000,000 Personal and Advertising Injury Limit.
  
  - b. Business Automobile Liability Insurance\*:
    - i. \$2,000,000 Each Accident for Owned, Non-Owned and Hired Automobiles.
  
  - c. Statutory Workers' Compensation and Employers' Liability Insurance\*:
    - i. \$1,000,000 Bodily Injury / Each Accident.
    - ii. \$1,000,000 Bodily Injury by Disease / Policy Limit.
    - iii. \$1,000,000 Bodily Injury by Disease / Each Employee.
  
  - d. Umbrella or Excess Liability Insurance (following form over the Commercial General Liability, Employer's Liability and Automobile Liability Insurance). If the Subcontract Amount is equal to or greater than \$1,000,000, the following minimum limits will be required:
    - i. \$3,000,000 Each Occurrence
    - ii. \$3,000,000 Aggregate
  
- \*Commercial General Liability Insurance and other liability insurance may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability Policy. If additional limits or coverages are required by Boldt or by the General Contract, the cost of such coverage is included in the Subcontract Amount.
  
3. All insurance required hereunder shall be with insurance companies with A. M. Best Ratings of A- or better, and on forms acceptable to Boldt.
  
4. Each insurance coverage required under this Subcontract shall contain clauses to the effect that the same may not be cancelled, not renewed or the limits of coverage reduced, with no less than thirty (30) calendar days' prior written notice to Boldt.
  
5. Each liability policy required by this Subcontract (Commercial General Liability, Automobile Liability and Umbrella or Excess Liability), shall name The Boldt Company, the Owner, and their respective officers, directors, agents, employees and assigns and all parties required to be named as additional insureds in the General Contract through the form of endorsement required by the General Contract. If a specific General Liability form of endorsement is not required by the General Contract, the General Liability endorsements shall be made by ISO Forms CG 2010 07-04 and CG 2037 07-04 or coverage at least as broad. This additional insured endorsement shall apply to both on-going operations and the completed operations coverage for the period of time Subcontractor is required to maintain such coverage for each Subcontract. The insurance required by this Exhibit shall be primary and noncontributory with respect to any other insurance available to the additional insureds. The limits of coverage required for the additional insureds are the greater of the limits required by each Subcontract or the limits actually carried by Subcontractor, including any limits available to Subcontractor under any Excess or Umbrella Liability policies. Subcontractor acknowledges that it will provide Umbrella and Excess Liability Insurance on behalf of the required named additional insureds of each Subcontract and that

the Umbrella and Excess Liability Insurance will be subject to Vertical Exhaustion before any other Primary, Umbrella or Excess Policies or any other insurance obtained by Boldt will contribute.

6. Any policy of insurance issued pursuant to this Exhibit shall include an endorsement providing that the insurers waive their rights of subrogation against Boldt or the Owner and, and their respective officers, directors, agents, employees and assigns and or any other party as required by the General Contract. Subcontractor hereby waives, and shall require its sub-subcontractors to waive, any and all rights of recovery which they or any of them or any of their insurers may now or subsequently have against Boldt or the Owner, and their respective officers, directors, agents, employees and assignees, in connection with any losses covered by insurance provided hereunder.
7. Worker's Compensation coverage shall be provided for any employee, owner or principal of the Subcontractor who shall be at the Project site or at a specific off-site Project related location whether or not required by statute.
8. Subcontractor shall carry sufficient comprehensive insurance on its equipment and personal property including tools and jobsite trailer. Subcontractor shall also insure all materials stored on and off the Project site and enroute to and from the Project site that will be incorporated into the Project or used in the completion of Subcontractor's Work, unless Subcontractor has verified in advance that these materials are insured under the Builder's Risk policy for the Project. Subcontractor agrees that Owner and Boldt shall not be responsible for any loss or damage to any equipment or personal property of Subcontractor and Subcontractor agrees to waive any and all subrogation rights against Owner and Boldt for any such loss, Claim or loss of use.
9. If Boldt is liable for all or some portion of the deductible under the Project's All Risk/Builder's Risk/property insurance, then Subcontractor shall reimburse Boldt for that portion of the deductible that arises from or is attributable to the acts or omissions of Subcontractor.
10. If (i) Subcontractor is providing architectural, engineering or other professional services, including services under a Testing Services Agreement or Design Build Subcontract, as a part of Subcontractor's Work; or (ii) such insurance is required by the Subcontract Documents; or (iii) such insurance is requested by Boldt, Subcontractor shall procure, maintain, and pay for Professional Liability/Errors and Omissions Insurance with limits of not less than \$1,000,000 each claim and \$2,000,000 annual aggregate. The Professional Liability Insurance shall contain prior acts coverage sufficient to cover Subcontractor's Work and shall continue in effect for two (2) years after final acceptance of the Project or longer if the General Contract requires. Policy shall include a waiver of subrogation on behalf of Boldt, the Owner, and the respective officers, directors, agents, employees and assigns and any other party as required by the General Contract.
11. Subcontractor will provide Pollution Liability Insurance if required by the Subcontract Documents or Boldt. If required, such insurance shall have limits of not less than \$1,000,000 each claim and \$2,000,000 annual aggregate. The Pollution Liability Insurance shall continue in effect for two (2) years after final acceptance of the Project or longer if the General Contract requires. This policy shall name Boldt, the Owner, and the respective officers, directors, agents, employees and assigns and any other party as required by the General Contract as additional insureds and include a waiver of subrogation on behalf of all additional insureds. This policy shall be primary and noncontributory with respect to any other insurance maintained by the additional insureds.
12. Specifically, the following information should be included in the Description of Operations/Locations/Vehicles section within the certificate of insurance:

Boldt Job # and Project Name & Description. All parties required to be named in the Subcontract shall be named as additional insureds to the General Liability, the Automobile Liability and the Umbrella Liability policies and apply to both on-going and completed operations. All policies herein are primary and non-contributory to any insurance available to the additional insureds. Waiver of Subrogation in favor of all parties required to be named in the Subcontract applies to the General Liability, Automobile Liability, Umbrella Liability and Workers Compensation policies. A 30-day notice of cancellation must be mailed to the certificate holder to all policies hereon.
13. The failure of Subcontractor to furnish a certificate of insurance, shall not alter or eliminate Subcontractor's obligation to obtain and maintain the insurance required, and to meet all other obligations established by this Exhibit. Boldt's receipt of a certificate of insurance that does not meet the requirements of the Subcontract is not a waiver, modification, amendment or alteration of the Subcontract and shall not in any manner relieve the Subcontractor of fully complying with these requirements.
14. At any time upon request, Boldt may request copies of the actual policies or endorsement copies.



DATE	PURCHASE ORDER NUMBER

**SELLER:**

**SHIP TO:**

ATTN:

ATTN:

PROJECT	SHIP VIA	F.O.B. POINT	DELIVERY REQ BY	PAYMENT TERMS

**BEING GOVERNED BY THE TERMS AND CONDITIONS, AND INSTRUCTIONS HEREON, PLEASE ENTER OUR ORDER FOR THE FOLLOWING:**

The undersigned SELLER agrees to provide to The Boldt Company as BUYER, the specified materials in compliance with this Purchase Order and its Terms and Conditions (the "PO") and the plans, specifications and other contract documents to the contract between BUYER and (all of which together are called the "PO Documents" and are incorporated into this PO by reference as fully as if written in it).

**DESCRIPTION OF MATERIALS:**

See attached Description of Materials Exhibit.

**PURCHASE ORDER PRICE:**

QTY	W/M	DESCRIPTION	ACCOUNTING CODE	RATE PER UNIT	TOTAL AMT
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SOV Total:  
SOV Vendor Tax Total:  
Grand Total:

In compliance with the requirements of the Federal Hazard Communication Standard (29 CFR §1926.59), this Purchase Order requires 2 copies of the Safety Data Sheets (as required by 29 CFR §1910.1200 Appendix D) to be sent on any product containing hazardous materials as described in the OSHA standards, one copy to be forwarded to the BUYER's attention as noted above with the acknowledged order and one copy accompanying the shipment.

**ACCEPTANCE**

Acceptance copy must be signed and returned immediately. SELLER, by acknowledging this PO or by delivering any portion of the Materials described above, warrants that SELLER has read and agrees to its Terms and Conditions, that SELLER has read and is familiar with all of PO Documents, and that all Materials will be and are furnished in accordance with the PO Documents and SELLER's samples approved by BUYER, if any.

WE HEREBY ACCEPT THE ABOVE ORDER SUBJECT TO THE TERMS AND CONDITIONS.	<b>THE BOLDT COMPANY</b>
SIGNATURE OF SELLER BY:	AUTHORIZED SIGNATURE:
PRINT NAME:	TITLE:

ACKNOWLEDGEMENT COPY-RETURN AT ONCE

### Terms and Conditions

These Terms and Conditions are a part of the PO and apply with full force and effect to this Purchase Order ("PO"), as of the date of the PO stated above, as follows:

1. **Materials.** "Materials" includes, but is not limited to, materials (raw or manufactured), equipment (assembled or non-assembled) and all related services, labor, preparation of shop drawings and other submittals and packaging required of SELLER to meet all of SELLER's obligations under this PO. SELLER shall sell to BUYER, and BUYER shall purchase from SELLER, the Materials specified in the PO at the Purchase Order Price(s) (the "PO Price") indicated. All packing, cartage charges and taxes are included in the PO Price. PO Price additions will not be allowed by BUYER unless otherwise specified on the face hereof. SELLER warrants and represents that it owns all rights necessary to furnish and install (if installation is required by the PO Documents) the Materials and that the use of the Materials in connection with the Project will not violate any patent, trademark, copyright, trade secret or other intellectual or other property right of any other person or entity.
2. **Compliance.** The Materials are to be supplied in strict compliance with the requirements of the PO Documents, all of which have been made available to SELLER for its review and all applicable laws. BUYER shall have the unqualified right to reject any Materials that fails to conform to the requirements of the PO Documents, or which are not delivered in a timely manner.
3. **Installation.** In the event that SELLER is required to perform installation or other services as a part of this PO through SELLER's employees, agents or subcontractors, the person(s) providing such services shall not be deemed an agent or employee of BUYER, and SELLER will have full responsibility for all acts and omissions of such persons including, but not limited to, liability for any wages, payroll taxes or benefit contributions. SELLER represents that any persons providing labor or other services at the Project site will be covered by worker's compensation insurance. SELLER shall be responsible for procuring and maintaining all required licenses and permits required for SELLER to perform any and all such services, at no additional cost to BUYER.
4. **Samples, Mock-Ups and Shop Drawings.** SELLER will provide, at its own expense, samples and mock-ups to comply with the requirements of the PO Documents. Shop drawings will be delivered in form, number and in time to comply with the requirements of the PO Documents and the BUYER's schedule. Approval of a submittal by BUYER, Architect and/or Owner which includes a substitution or otherwise deviates from the requirements of the PO Documents does not constitute approval of the substitution or deviation unless the substitution or deviation is brought to the attention of BUYER and is set forth in a Change Order.
  - a. **Conflicts.** Should SELLER discover any conflict, error, omission or discrepancy in the plans or specifications, or any approved submittal, SELLER shall have an absolute duty under this PO to notify BUYER of any such conflict, error, omission or discrepancy in writing within twenty-four (24) hours of its discovery. SELLER shall not proceed until BUYER responds in writing to SELLER's notice.
  - b. **Commencement.** If SELLER fabricates, furnishes or installs the Materials prior to receiving BUYER's written instructions in response to SELLER's notice, all necessary alterations, repairs or corrections shall be solely at SELLER's cost and expense.
  - c. **Substitutions.** No substitution shall be permitted without the written consent of BUYER. If SELLER proposes any substitution, SELLER guarantees that the substitution is equal in all respects to the specified Materials, including the quality, finish, capacity, durability, ease of maintenance and ease of installation to that originally specified herein.
5. **Certificates, Drawings and Operating Manuals.** SELLER will supply proper operating, training, installation, and maintenance manuals, drawings, and any other documentation as required by the PO Documents for all Materials.
6. **Inspections and Testing.** Except as otherwise provided in the PO Documents, all shipments shall be subject to final inspection by the BUYER after receipt by the BUYER. Shipments shall be accompanied by detailed delivery tickets to assist the BUYER in its inspection. Should the BUYER discover any damage or shortfalls, the BUYER shall promptly report them to the SELLER. The BUYER shall have the right to reject and refuse acceptance of materials or equipment that are not in accordance with the PO Documents. The BUYER may deduct from any amount owed to the SELLER under this PO the
  - reasonable cost of re-inspecting rejected materials and equipment. Materials or equipment not accepted due to nonconformance with the requirements of the PO Documents shall, at the BUYER'S option be (a) returned to the SELLER at the SELLER'S expense; (b) held by the BUYER for an equitable reduction in the PO Price; or (c) repaired at the SELLER'S expense. Incorporation of the materials or equipment into the Project shall constitute acceptance by Buyer of such materials or equipment and incidental services, if any, subject to Seller's warranty obligations. The BUYER, Owner, and Owner's representative shall have the right to inspect all materials or equipment during any stage of manufacture or production by the SELLER or SELLER'S supplier, to audit quality assurance programs, and to otherwise assure quality control in the production and manufacture of the materials or equipment hereunder by the SELLER or SELLER'S, and the SELLER shall provide reasonable access, facilities, and assistance for the safe and convenient inspection or audit at the SELLER'S plant or its supplier's plant. Except in cases of emergencies, if the BUYER chooses the repair of nonconforming materials, the BUYER must provide the SELLER written notice of such nonconformance and request the SELLER to repair such nonconformance. Within seven (7) calendar days after receipt of written notification, the SELLER must commence and continue satisfactory correction of such nonconformance with diligence and promptness, or the BUYER may undertake such repair and charge the costs thereof to SELLER.
7. **Shipment, Delivery, Delays and Time is of the Essence.**
  - a. **Shipments.** SELLER shall notify BUYER of the shipping date and the initial carrier prior to shipment. If BUYER is to pay freight charges, the shipper and routing must be approved by BUYER before shipment is made. Any discount periods will be calculated from the date of receipt of the Materials or the date an invoice complying with this PO is received by BUYER, whichever is later.
  - b. **Delivery.** SELLER shall make all required deliveries to a location specified by the BUYER, by the date specified in this PO under the heading "Delivery Req By". Time is of the essence in this PO. No delivery shall be made without at least 24 hours' advance notice being given by SELLER to BUYER. Delivery in advance of the "Delivery Req By" date is not permitted without the BUYER'S consent.
  - c. **Delays.** SELLER has been informed by BUYER that the Materials will be used in a construction project where BUYER has obligations to third-parties. BUYER, pursuant to the PO Documents, must perform by specified dates. SELLER has been provided full access to scheduling information in the possession of BUYER to ensure timely delivery of all work. Therefore, SELLER agrees that it shall be liable for any damages or costs associated with the failure of SELLER to meet its obligations under this PO as may be extended as permitted by the PO Documents. If deliveries are delayed beyond the date specified in this PO and no extension of the schedule is justified under the PO Documents, BUYER shall have the right to (i) request that SELLER ship the Materials by other means at SELLER's expense; (ii) terminate this PO for cause and purchase the Materials from a third party and recover the damages and costs incurred by BUYER from SELLER; or (iii) pursue such other legal or equitable remedies available to BUYER.
  - d. **Changes in Schedule.** BUYER may change the schedule from time to time to adjust to job conditions and SELLER shall modify its shipping schedule to accommodate BUYER without additional cost.
  - e. **Risk of Loss.** The F.O.B. term used in this PO is a delivery term, but risk of loss shall remain with SELLER until acceptance of the Materials by BUYER at the delivery destination or until the Materials have been accepted and approved by Owner under the PO Documents, whichever is later.
8. **Changes.** BUYER at any time, by written notice to SELLER, may alter or vary the Materials subject to this PO, and make additions or deletions to the Materials ordered, including the quantities ordered. If additional Materials are ordered and those Materials are subject to a unit price stated in this PO, they will be furnished at not more than the unit price. SELLER, at any time, by written notice, may submit a request for change to BUYER, but BUYER has no obligation to accept that request.
  - a. **Costs Excluded.** SELLER shall not be entitled to any increase in the PO Price nor any monetary payment, reimbursement, or compensation over and above the PO Price for any:
    - i. delay in the commencement of SELLER's performance of its obligations under this PO, or in SELLER's ability to continue that performance once it has commenced; or
    - ii. loss of productivity, inefficiency, out-of-sequence activities, or other similar claims, or



- iii. loss, cost, damage, or expense of any kind, including but not limited to extended performance costs, overhead, price escalation of any sort, including gas, fuel and oil price escalation, lost opportunity cost, loss of past, present or future income or profits, impact damages, acceleration costs, consequential, incidental or indirect damages, punitive damages or other similar costs, which may arise out of or be caused by any delay, disruption or impact to the SELLER's ability to perform its obligations under this PO from any cause or any extensions of the time, whether or not such delays are foreseeable. SELLER expressly waives any right to claim such loss, cost, damage, or expense.
- b. **Owner Changes.** For changes initiated by Owner, Architect or their representatives, the PO Price shall be adjusted only in the amount approved by Owner for the change less the amount of BUYER's markup on the change. In no event shall BUYER be liable to SELLER for an amount greater than the amount received by BUYER from Owner for such changes, less the amount of BUYER's markup on said work.
9. **Removal and Replacement of Defective Material, Equipment, Items or Work.** SELLER will promptly remove any Materials that BUYER designates as nonconforming or defective. At its sole cost and expense, SELLER will promptly replace defective or nonconforming Materials, so as to avoid disrupting or delaying BUYER's schedule. Any such disruption or delay to BUYER'S schedule shall be considered a SELLER'S breach. If BUYER discovers any nonconforming or defective Material after installation, SELLER shall be liable for all costs incurred to remove and re-install conforming Materials. SELLER shall be responsible for repairing and replacing any surrounding areas of work affected by the removal, replacement and re-installation of nonconforming and/or defective Materials, regardless of whether SELLER was originally responsible for installation of the affected areas of work.
10. **Warranty.** SELLER warrants that it is a merchant as defined in the Uniform Commercial Code, that the Materials are fit for the purpose intended and that the Materials are merchantable, of good quality and free from defects, whether patent or latent, in material, workmanship and design. No warranty shall be deemed waived by reason of any inspection, acceptance or payment by BUYER. Each warranty expressed or implied will remain in effect for the period prescribed by law or the period prescribed by PO Documents, whichever is longer. These warranties shall extend to the Owner and Owner's successors and assigns, and the SELLER shall provide directly to the ultimate user written evidence of these warranties as required.
11. **PO Price and Payment Terms.** Payment of the PO Price will be made based on the payment terms set forth on the PO, provided however payment may be made to SELLER within ten (10) days of BUYER receiving payment from Owner in BUYER's discretion
- a. **Condition of Payment.** As a condition precedent to payment, all required Materials covered by SELLER's invoice must be received by BUYER unless provided within the PO and SELLER shall submit all required conditional and unconditional releases and lien waivers in a format acceptable to BUYER and such other documents as may be required by the PO Documents or by Owner or Owner's lender.
- b. **Payment not Acceptance.** No payment under this PO shall be considered or deemed to represent that BUYER has inspected the Material or has checked their quality or quantity and shall not be deemed or construed as acceptance of any Materials, or as a waiver of any claim or right that BUYER may then or have in the future, including any warranty claim.
- c. **Final Payment.** Final payment shall not be due to SELLER until SELLER has provided all close-out documentation, including any Warranty documents, required by the PO Documents and by Owner.
- d. **Effect of Payment.** SELLER's acceptance of final payment (whether such payment is a single payment or installment payments) shall constitute a full and final waiver and release of any and all claims by SELLER against BUYER arising out of this PO or otherwise related to the Project. This waiver may not be modified by any restrictive endorsement, writing or other action or course of conduct of the parties. SELLER's obligations, and BUYER's rights under this PO and all applicable laws, shall survive SELLER's receipt of final payment.
12. **SELLER's Breach.** If SELLER breaches or fails to perform any obligation under the PO Documents, BUYER may terminate this PO for cause on written notice to SELLER. In the event of SELLER's breach or failure to perform, whether or not the PO is terminated, SELLER shall be liable to BUYER for all costs and other damages BUYER incurs as a result of SELLER's breach of, or failure to perform, this PO in accordance with the PO Documents. SELLER's failure to perform shall include, but not be limited to, the failure of its suppliers, vendors and subcontractors of any tier to perform in accordance with the PO Documents. SELLER's liability shall include, but not be limited to:
- damages and other potential liability for which BUYER may be liable to Owner,
  - BUYER's increased costs, such as repair costs, remedial costs, completion costs, re-installation costs, extended home office and field overhead, price escalation and increased costs resulting from SELLER-caused delays or improper, nonconforming work performed by SELLER,
  - warranty and other remediation costs,
  - completion costs,
  - liability to third-parties including other subcontractors and suppliers of the BUYER,
  - costs of materials, parts equipment or other goods to replace any defective Materials,
  - attorneys' fees, consultants' fees, and related expenses of resolving disputes related to SELLER's failure to perform in addition to those costs otherwise recoverable under this PO,
  - interest costs and costs of debt financing,
  - storage costs, and
  - SELLER and BUYER agree that the aforementioned damages are foreseeable and have been reasonably contemplated by the parties. SELLER's liability for such damages does not relieve it from its obligation to fully perform this PO. If a subsequent determination is made that BUYER did not have cause to terminate the PO under this Section 12, it shall be treated as a cancellation under Section 15 below.
13. **Indemnification.** SELLER shall indemnify, defend and hold BUYER and Owner harmless, from any and all claims, liability, losses or damages, including attorneys' fees, actually or allegedly for bodily injury or property damage sustained by a third party to the extent caused or contributed to, whether in whole or in part, by any defect in any Materials, delay in furnishing any Materials, breach of contract, strict liability, negligence or wrongful act of SELLER or its employees agents or subcontractor or anyone else for whom SELLER is responsible. If the PO Documents contain additional obligations that require BUYER to indemnify, defend and hold harmless Owner and/or other persons or entities from any other claims, causes of action, defaults, liabilities, or other obligations (the "Owner Indemnity Claims"), SELLER agrees to indemnify, defend and hold harmless the BUYER and Owner from and against any claims, lawsuits, damages, losses, demands, judgments, expenses, liability or other obligation arising from any Owner Indemnity Claim (and any attorney's fees or expenses incurred by BUYER as a result of any Owner Indemnity Claim and to enforce its rights against SELLER under this PO) that is caused or alleged to have been caused by any act or omission of SELLER.
- a. **Infringement.** SELLER shall indemnify, defend and hold BUYER and Owner harmless from, for and against any use or infringement or alleged use or infringement of patent, copyright, trade secret or other intellectual property right arising from any Materials provided by SELLER or any of its employees, agents or subcontractors under this PO, including, but not limited to, any and all damages and legal fees which may arise or be incurred by BUYER or Owner in connection with any claim or litigation initiated by any third party alleging such use or infringement.
- b. **Liens.** Provided BUYER has made payment of all undisputed amounts due under this PO, SELLER shall not, and shall not permit any of its subcontractors, suppliers, mechanics, laborers, or materialmen to file any stop notices, liens, or other claims or encumbrance (a "Lien") against the Owner or the Owner's property, including the Project. If a Lien is filed, SELLER shall take immediate action to discharge and remove it and shall defend, indemnify and hold harmless the BUYER, Owner, Project, and land on which the Project is located, from all claims, losses, demands, causes of action, damages, and costs of whatever nature arising out of such Lien.
14. **Insurance.** SELLER warrants that it has acquired Commercial General Liability Insurance, Automobile Liability Insurance and, if required by applicable Laws, Worker's Compensation Insurance as follows. If requested, SELLER shall provide Certificates of Insurance and endorsements verifying required insurance coverage prior to delivery.
- Commercial General Liability Insurance:
    - \$1,000,000 Each Occurrence
    - \$2,000,000 General Aggregate

\$2,000,000 Products/Completed Operations Aggregate  
 \$1,000,000 Personal and Advertising Injury Limit

b. Automobile Liability Insurance  
 \$1,000,000 Each Accident

c. Workers' Compensation Statutory Limits Employer's Liability Insurance:  
 \$500,000 Each Accident  
 \$500,000 Policy Limit  
 \$500,000 Each Employee

d. Each liability policy required by this PO shall name the Owner and BUYER and their respective officers, directors, agents, employees and assigns as additional insureds ("Additional Insureds"). This additional insured endorsement shall apply to both ongoing and completed operations coverage for the period of time SELLER is required to maintain such coverage for this Project. The insurance required by Section 14 shall be primary and noncontributory with respect to any other insurance available to the additional insureds.

e. Any policy of insurance issued pursuant to Section 14 shall include an endorsement providing that the insurers waive their rights of subrogation against the Additional Insureds. The SELLER hereby waives any and all rights of recovery which they or any of them or any of their insurers may now or subsequently have against the Additional Insureds.

f. SELLER shall carry sufficient comprehensive insurance on its equipment, personal property, and materials on and off the project site and on route to and from the site that will not become a part of the work. SELLER agrees that Owner and BUYER shall not be responsible for any loss or damage to any equipment, personal property or materials of SELLER and SELLER agrees to waive any and all subrogation rights against Owner and BUYER for any such loss or damage.

15. **Cancellation.** BUYER may terminate this PO at any time with or without cause by giving written notice to SELLER. Upon receipt of such notice, SELLER shall immediately stop supplying, manufacturing and fabricating Materials under this PO and shall not produce any further Materials or order any more raw materials unless specifically authorized in writing by BUYER. BUYER shall pay SELLER, as SELLER's sole remedy for cancellation under this Section 15, the cost of the Materials delivered by SELLER prior to the notice of cancellation; and upon delivery to BUYER, at BUYER's request, any partially completed Materials and any raw materials purchased by SELLER prior to notice of cancellation that are unique to this PO; and any reasonable cancellation costs to third parties incurred by SELLER, provided SELLER (i) assigns all subcontracts, purchase orders, leases, consulting agreements and other agreements related to this PO to BUYER as BUYER shall select; and (ii) delivers to BUYER all warranties, designs, drawings, specifications, shop drawings, submittals and other documents (the "Deliverables") related to the Materials and assigns all right, title and interest, including copyrights and patents in the Deliverables to BUYER. Under no circumstances shall BUYER be obligated to SELLER for any profit on Materials not supplied or any consequential, incidental or indirect damages as a result of cancellation under this Section 15.

16. **Confidentiality.** Any Materials made according to BUYER's design or developed for BUYER at BUYER's direction, or any designs supplied by BUYER or copies thereof, shall be and are the property of BUYER and SELLER shall not use them for any other person or provide them to others without BUYER's written consent. This PO is strictly confidential, and any and all publicity or release of any information in any form or format about it or the Materials or the Project shall not be done without the written consent of BUYER and Owner.

17. **Disputes.**

a. **Meeting of Party Representatives.** If a dispute arises under this PO ("Dispute") between BUYER and SELLER, the representatives of BUYER and SELLER shall attempt to negotiate its resolution. If they are unable to resolve it, the Dispute shall be referred to a member of senior management of BUYER and SELLER for their direct negotiations.

b. **Mediation.** If such resolution is not reached within a reasonable amount of time, not to exceed sixty (60) days, the Dispute shall be referred to nonbinding mediation in accordance with the mediation rules and procedures of JAMS (or its successor). The parties shall each pay one-half of the JAMS mediation fees and expenses.

c. **Litigation.** If the matter is unresolved after submission of the matter to a mitigation procedure or mediation, the Parties shall submit the matter to litigation in either the state or federal court having jurisdiction of the matter in the location of the Project. **EACH OF THE PARTIES HEREBY WAIVES TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY WITH RESPECT TO ANY COURT PROCEEDING DIRECTLY OR INDIRECTLY ARISING OUT OF AND PERMITTED UNDER OR IN CONNECTION WITH THIS PO, THE PERFORMANCE OF SELLER'S SERVICES OR THE TRANSACTIONS CONTEMPLATED BY THIS PO.**

18. **Attorneys' Fees.** Should BUYER or its insurer(s) or bonding company(ies), employ an attorney to institute and maintain a lawsuit, arbitration, mediation, or other legal proceeding, to enforce or defend any of BUYER's rights under this PO, to protect BUYER's interest in any matter arising under this PO, to collect damages for the breach of this PO or any other amounts owed to BUYER, then BUYER shall be entitled to recover its attorneys' fees, costs, charges and expenses from SELLER and SELLER agrees to pay said attorneys' fees, costs, charges, and expenses.

19. **Compliance with Law and Safety.**

a. SELLER shall strictly comply with all federal, state and local laws ordinances, rules, regulations, standards and orders (collectively, "Laws") bearing on the performance of its obligations under this PO, and shall maintain all required licenses, permits, forms, books, and records required of SELLER to do so. SELLER's failure to comply with federal, state and local law applicable to this PO shall be grounds for termination of this PO under Section 12 above.

b. SELLER agrees to abide by the provisions of the following related to equal employment opportunity, to the extent applicable, which are incorporated herein by reference: 41 C.F.R. §§ 60-1.4(a), 60-300.5(a), 60-741.5(a), 61-300.10, Executive Orders 11246, 13465 and 13672. As applicable, **SELLER shall abide by the requirements of 41 CFR § 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability, and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified individuals with disabilities. To the extent applicable, SELLER shall abide by the requirements of 41 CFR § 60-300.5(a). This regulation prohibits discrimination against qualified protected veterans and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans.**

c. In the event the SELLER, its employees, or agents are required to come onto the Project site in connection with the performance of its obligations under the PO Documents, the SELLER shall comply with all applicable safety requirements and Laws.

20. **Assignment and Delegation.** SELLER shall not directly or indirectly assign, convey, transfer, encumber or otherwise dispose of all or any portion of its interest in, or its rights and obligations under this PO without the prior written consent of BUYER. BUYER may assign or delegate any or all of its rights or obligations hereunder without the prior consent of SELLER.

21. **Governing Law.** This PO shall be governed by, construed under and enforced in accordance with the laws of the state where the Project is located, exclusive of conflict of law provisions.

22. **Severability.** The invalidity of one or more provisions of this PO shall not affect the validity of the remaining portions of the PO.

23. **Joint Drafting.** The Parties expressly agree that this PO was jointly drafted, and that they both had opportunity to negotiate terms and to obtain assistance of counsel in reviewing terms prior to execution. This PO shall be construed neither against nor in favor of either Party, but shall be construed in a neutral manner.

24. **Intent.** This PO constitutes the full and final agreement of the parties with regard to the subject matter hereof as of the date of this PO, and supersedes and replaces any and all prior negotiations, understandings and agreements, whether oral or written, between BUYER and SELLER with respect to the subject matter hereof. No term, condition, usage of trade or course of dealing shall be relevant or admissible to supplement, explain or vary any of the terms of this PO. This PO may be modified only by a writing signed by both parties.

# The Boldt Company Safety Program

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	<b>Safety Program</b> A. Commitment to Safety	Reviewed: January 4, 2019 Effective: February 1, 2006
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## MEMORANDUM

TO: All Boldt Employees

FROM: Bob DeKoch, President and COO

RE: Commitment to Safety

The Boldt Company has had a long history of superior safety performance and continuous improvement. Boldt employees everywhere can take great pride in their dedication to keeping our work environment safe.

Over these years of improvement, Boldt has continuously introduced new safety initiatives and campaigns to keep all of our minds focused on safety as a number one priority. Whether the safety initiatives involve safety rules, personal protective equipment, OSHA training, or a drug free workplace, etc., as a Boldt team, we are always working to bring the very best safety practices to our job sites and our offices.

You've done well, and with your support, we will continue to improve upon our success.

Your families are counting on you to be with them for a long, long time.



## Safety Program

### B. Safety Program Overview

Reviewed: January 4, 2019

Effective: February 1, 2006

## Safety Program Overview

Boldt considers employees their most valuable asset. We believe in maintaining a high quality safety culture for the protection of all. It is also our belief that through engineering, preventive maintenance, education/training, and motivation of employees, incidents can be minimized, if not prevented entirely.

All operations must be performed in such a manner to minimize potential injuries/illnesses and the consequences related to them. Safety is considered the primary responsibility of each person.

Boldt will not tolerate acts or attitudes which jeopardize safety. Such acts or attitudes will be considered a basis for disciplinary action. Cooperation is necessary for the protection of all. It is important that each employee knows and follows the basic safety rules that have been set forth. These rules can be found in this manual, the Employee Work Rules and Safety Manual, and within the OSHA handbook. No one is to take unnecessary chances. Use all safeguards and safety equipment provided. Make safety a regular part of your daily job.

### Purpose

The purpose of this safety program is to provide policies and guidelines to eliminate serious incidents and the consequences of all incidents to negligible levels. Injuries/Illnesses to employees are the first and primary consideration; facility and property damage is secondary.

### Scope

This program outlines and defines responsibilities, describes actions and methods, etc. which will reduce and keep to a minimum manpower and monetary losses resulting from incidents, thus providing efficient utilization of resources and advancing the effectiveness by which the company's construction projects will be completed.

### Concepts

Incident prevention is a total management responsibility. Top management will keep informed and assure that supervisors are given direction to carry out the proper safe practices and procedures. Supervisors are held accountable within the scope of their work assignment for personnel, property, and materials under their immediate jurisdiction.

### Philosophy

The philosophy of this safety program is that through engineering, preventive maintenance, education/training, and motivation of employees, all incidents can and must be prevented.

### Goals

Our safety goal as a company is simple and realistic - to be accident free. Through leadership, teamwork, and training, we can achieve this goal. We must have a total commitment to this philosophy; anything less is not tolerated. Every employee, subcontractor, client, and visitor is a valued asset to Boldt, and we're committed to protecting their health and welfare.

## **Safety Audits**

Safety audits are a means of surveying and analyzing the problems of unsafe conditions and work practices which result from a continual change during the development of construction projects.

In addition to audits performed by safety professionals, inspections are to be made by the project manager, superintendent, or other designated representative.

## **Education And Training**

The key to this safety program is the training of each employee. Each employee must know the best way to perform each assignment and must be kept continually aware that proper conduct and adherence to instructions are necessary for safe operation. Safety education and training methods to be utilized are as follows:

- Management personnel are to be certified in first aid and CPR.
- Each new employee receives an orientation which includes an explanation of the Employee Work Rules and Safety Manual. After orientation, including an opportunity for questions and answers, the employee signs the acknowledgement form in the back of the manual (Exhibit A). This is placed in their personnel file.
- Special emphasis is given to each employee being transferred to a different job. The job instructions are carefully explained to the employee by the foreman. The foreman makes certain that those employees under his supervision carry out their jobs in a safe and efficient manner and familiarize themselves with basic guidelines.

To ensure the effectiveness of our safety and health training, written and hands-on practical testing is conducted in areas of cranes, forklifts, aerial work platforms, excavating/trenching, scaffolding, powder-actuated tools, lockout/tag out, confined space, etc. This is always additional to supplement an extensive knowledge base of training received via the union. This allows us to groom employees to our specific-safety practices and culture. Written testing and practical evaluations are also completed in AED/CPR, and the 10/30 Hour OSHA Training Programs. Our intent is that all management and supervisory personnel receive these certifications. Certification cards are issued to employees verifying completion and understanding of the training. The follow-up upon any education is verifying that these practices are implemented in the field. That's the assurance of effective safety training as well as a means of providing accountability. All documentation is maintained by the Corporate Safety and Training Departments.

In particular, project managers, superintendents, foremen, and safety personnel are held responsible for monitoring individuals work activities, verifying that the employee understood the material taught in the classroom or in the field. We, as a company, are responsible and accountable to verify individuals are following safe work practices. Those who are not completing a task correctly are stopped and time is taken to discuss/re-train the individual so the activity can be done correctly and safely. Through our continued commitment and effective safety management process, we've built a strong foundation and culture that embraces safety.

## **Preventive Maintenance**

A preventive maintenance program will be established and maintained to address machinery and equipment before they break and create a hazardous condition. This program will include an equipment inventory, maintenance and inspection schedule with records of work, and a process to remove and repair defective equipment.

There will be an up-to-date inventory of equipment and machinery to be maintained, with new equipment to be added to the inventory.

An inspection and preventive maintenance schedule will be established for all equipment on the inventory based on applicable regulations, manufacturer requirements and industry standards, and all preventive maintenance will be documented and records kept for the life of the machinery or equipment.

All observed defects in machinery or equipment will be reported to a supervisor, and the equipment will be removed from service and must be repaired before being used again, or replaced.

### **Subcontractor Management Plan**

Subcontractor selections will include reviewing the following safety metrics: safety programs, safety training documents, prior post-job safety performance reviews, and safety statistics such as: TRIR, EMR, DART, and Fatality Rate.

Subcontractors and their employees will be expected to participate to the same degree of Boldt employees in the following safety procedures: pre-job meetings, kick-off meetings, safety orientations, tailgate safety meetings, job safety analysis, hazard assessments, and job safety inspections.

At the end of the contracts, a post-job safety performance review will be completed for subcontractors and used in subsequent subcontractor selections.



# Exhibit A- Employee Work Rules and Safety Manual

Detach and return this form to your supervisor after you have read and understood this booklet/manual.

I have received a copy of BOLDT'S EMPLOYEE WORK RULES AND SAFETY MANUAL, which includes the EQUAL EMPLOYMENT OPPORTUNITY STATEMENT, containing ANTI-HARASSMENT/RETALIATION POLICIES, and COMPLAINT PROCEDURE.

I shall comply with these practices in order to make this job and any future projects a better place to work.

Print Name: \_\_\_\_\_

Signed: \_\_\_\_\_

Last Four Digits of Social Security # \_\_\_\_\_

Date: \_\_\_\_\_

Job #/Location: \_\_\_\_\_

Craft: \_\_\_\_\_

Company: \_\_\_\_\_



## Safety Program

### C. Responsibilities

Reviewed: January 4, 2019

Effective: January 9, 2006

## Safety Director Responsibilities

The Safety Director reports directly to the President/COO of the company. The Safety Director is responsible for the direction of the safety program in an advisory capacity. The Safety Director recommends and implements an approved safety policy and continuously evaluates the effectiveness and/or requirements of the program and reports findings together with his or her recommendations to the Vice President of Human Resources, Project Managers, and jobsite Superintendents.

Duties and responsibilities of the Safety Director are as follows:

- In coordination with Safety Representatives, Project Managers, Superintendents and Foreman, determine the necessity for personal protective clothing and equipment for safety purposes and approve the selection of articles to be purchased and supplied.
- Provide a written report of audits made of the jobsites, storage yard, office, and shop area with copies to the responsible personnel for correction and implementation. On a jobsite this would be the Project Manager, Project Superintendent, and job safety file.
- Make audits of temporary structures such as scaffolding, form work or hoisting equipment (for strength, stability, and adequate safeguards) and ascertain that routine technical audits are made.
- Investigate and report serious incidents (injury, property damage, near miss, etc.); conduct appropriate investigation and recording of details of less serious incidents.
- Prepare and make monthly distribution of accident incidence and accident cause analysis.
- Review those audits made by others that bear on safety to ensure compliance with company policies as well as federal, state, and local safety regulations.
- Ensure employee safety training by conducting safety meetings and/or distributing relevant safety information to Safety Personnel, Project Managers, Superintendents and Foreman.
- Serve as liaison with federal, state, local, and private agencies on matters pertaining to industrial or construction safety, health, environmental issues and hygiene.
- Stop any operation or action which is judged an imminent hazard until the hazardous condition or procedure can be remedied. The Superintendent must be immediately informed when this type of action has been taken.
- Maintain and actively manage safety over subcontractor operations.

## Project Managers And/or Project Superintendents

Project Managers and/or Superintendents have full responsibility for the execution of the company's safety program within their areas of supervision. In any case in the planning or execution of the safety program where an interface of responsibility exists or arises, each Project Manager and/or Superintendent involved has the responsibility to see that proper and effective action is taken. Any safety matter of this type which cannot be resolved by the Project Manager and/or Superintendent shall be referred to the Safety Director without delay. Project Managers and/or Superintendents shall be responsible for the safety of employees assigned to their project, to the public, damage to company or other property, and loss of, damage, and/or abuse to equipment and tools.

Project Superintendents shall also be responsible for:

- Assuring that proper and positive corrective action is taken on safety recommendations resulting from deficiencies detected by safety audits, or evident in the accident analysis of major or minor incidents.
- Participating with the Project Manager and Safety Director in making a pre-job safety survey

prior to the commencement of the job and when requested.

- Communicating safety information to and alerting the Foreman of potential hazards that may develop from their daily operations.
- Assuring that all required signs are posted and bulletin boards are maintained in clear and legible condition. Some of the required posters are as follows:

**Federal**

Equal Employment Opportunity including American Disability Act  
Federal Minimum Wage  
Polygraph  
OSHA Job Safety and Health  
300A Log  
USERRA

**State**

Fair Employment  
Family and Medical Leave  
Unemployment

**Boldt**

Assured Grounding  
Utility Telephone  
Number  
Emergency Telephone Number

- Implementing an effective housekeeping program which will include the following:
  - a. Assignment of definite housekeeping duties to specific individuals.
  - b. Daily housekeeping inspections of the jobsite.
- Maintaining a workable inspection schedule of the following:
  - a. All rigging equipment including: wire rope, shackles, blocks, slings, manila rope, chain falls, come-a-longs, etc.
  - b. Fire extinguishers, first aid kit(s), powder actuated tools, and pneumatic equipment.
  - c. Major equipment such as cranes, derricks, trucks, welding machines, air compressors, etc.
  - d. Electrical cord sets, receptacles, and tools in accordance with the Ground Fault Protection Program (assured equipment grounding and ground fault circuit interrupters).
  - e. Personal protective and lifesaving equipment.
  - f. Excavation and trenches.
- Informing supervisors to require all employees to properly use personal protective equipment such as safety lines, hard hats, glasses, goggles, clothing, ventilation equipment, etc.
- Making spot checks covering unsafe acts, unsafe conditions, condition of equipment, and observance of safety rules.
- Personally reviewing all injuries with the injured party and his/her foreman and participating in the investigation of all fatal and disabling incidents or those involving equipment damage.
- Instilling in all personnel by action, example, and training a sincere attitude toward safety and developing a better understanding of accident prevention methods.
- Enforcing compliance with federal, state, city, and other agency requirements, and those of the owner(s).
- Obtaining reports from subcontractors regarding any incidents involving their employees or property, and conducting an appropriate investigation.
- Ensuring that weekly safety meetings are held (preferably early in the week) and that reports are submitted to the safety representative's office.

- The rehabilitation and return of injured employees to productive work.

### **Foreman**

Foremen have direct daily contact with their workers. They are the supervisors from whom employees receive their orders on what to do and how to do it. Therefore, the influence of foreman with employees will be used to the fullest extent to promote safety. Foreman of all trades are responsible for enforcement of all safety precautions applicable to the work under their supervision in order to minimize, if not prevent, construction incidents.

As a minimum guideline, foreman will be responsible for:

- Understanding the requirements of OSHA and all other pertinent safety regulations and/or guidelines.
- Enforcing all safety rules and regulations within the scope of their work assignment.
- Expediting corrective action to correct unsafe acts or conditions.
- Requesting assistance from the Superintendent whenever necessary to properly carry out effective safety and incident prevention activities.
- Explaining all applicable safe practice rules and regulations to employees under their direct supervision, and training the assigned employees in the safe and efficient way to perform assigned tasks.
- Educating new employees in the applicable operating and safety rules of the particular crew.
- Determining that each employee is qualified and able to perform the work being assigned.
- Obtaining, distributing, and maintaining personal protective equipment necessary for the job such as hard hats, goggles, respirators, gloves, boots, etc.
- Providing employees and the public with necessary protection from hazardous situations or conditions.
- Reporting immediately to the Superintendent all injuries, damages, or losses, and arranging for any first aid, medical care, or prevention of further injuries or damages, as necessary.
- Investigating and completing a record of all injuries or damages of any nature that result from work performed by the crew.
- Reporting to their Superintendent, employees who, after reasonable training, fail to follow the company's safe work policies and procedures.
- Attending/conducting safety meetings.
- Forwarding to their Superintendent all requests, suggestions, and complaints made to them regarding safe working conditions.
- Cooperating in the rehabilitation and return of injured employees to useful work.

### **Employee**

Employees are responsible for their own safety, and likewise have a responsibility to their family, fellow workers, community, and employer.

Employees shall:

- Comply with all company rules including company safety policies and all government safety regulations
- Follow instructions from their supervisor(s)
- Use personal protective equipment and safety devices for machinery, equipment, tools, and work procedures
- Report all accidents and injuries immediately to their supervisor
- Report all unsafe conditions/acts to their supervisor
- Report to work rested and physically fit



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: January 1, 2003

## Accident Reporting and Records

This procedure establishes a uniform method for reporting personal injuries/illnesses (employees and non-employees), property damage, and vehicle incidents, and the subsequent handling of the forms and records as required by the company and by law.

### Reporting Personal Injuries

#### Personal Injury to Employee While on Duty:

- In an effort to provide easy injury reporting and prompt, accurate identification of medical treatment options, it is required that you utilize CareOnSite (**833-522-9777**), a telephonic injury triage service provider, to report all non-life-threatening work-related injuries. This service addresses work related injuries immediately by providing access to specially trained nurses by telephone from any jobsite or even from home at any time. The goal of utilizing CareOnSite is to take the guess work out of the decision to seek outside medical treatment and to achieve 100% reporting of all workplace injuries, no matter how minor.
- It is the responsibility of the superintendent to assist any injured employee with placing a call to CareOnSite (**833-522-9777**) if a Boldt employee is injured on your project. The injured employee will speak with a specially trained nurse who will assess the severity of the injury and make recommendations for the best course of treatment. After a careful and thorough review of how the injury happened and the symptoms being experienced, referral to an appropriate medical facility will be provided. In some cases, self-treatment of the injury may be recommended. Either way, follow up calls with a CareOnSite nurse are unlimited for Boldt employees.
- In every case where personal injury/illness requires a medical attention; it is the responsibility of the superintendent and/or other designated representative to supply the attending physician with a "Treatment Authorization" form (Exhibit B). It must be given to the employee after being completed by the doctor, or equivalent, and then forwarded to the corporate office. Necessary information will be transferred to the Employer's First Report of Injury form for the respective state and forwarded to the insurance carrier.
- It is the responsibility of all Boldt supervision and safety personnel to have immediate access to the CareOnSite hotline number (**833-522-9777**). Please keep in mind that this is **NOT** a substitute for a 911 call if required.

NOTE: In the event of a serious personal injury or fatality outside of normal working hours, contact your local safety professional or:

Cory Goldschmidt – 920-225-6168 (work); 920-920-470-2076 (cell)

### Distribution of Reports

A CareOnSite report will be generated and emailed to all assigned HR, Risk Management, and Safety personnel for distribution as instructed.

### Lost Time Injury:

- For employees with injuries/illnesses resulting in days away from work, the Safety Department must be telephoned immediately with all pertinent information. A "return to work" authorization from the doctor, or equivalent, must be supplied by the employee before he/she can start work after a lost time injury.

### Personal Injury to Non-Employee:

- An incident report must be prepared and submitted whenever a non-employee may have been injured by acts of company personnel or as a result of, or due to, company property or its operations. The superintendent or other designated representative must submit an incident report to the corporate office.
- According to OSHA, any employer covered by the Act must keep records of the accidents which occur. These records are kept on the Accident Log Form 300. Only recordable injuries/illnesses need to be entered on the log such as occupational deaths, occupational illnesses, occupational injuries involving loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment other than first aid. This log will be maintained in the corporate office.
- A summary of occupational injuries and illnesses (300A) will be prepared and must be posted at: the corporate office, regional offices, and active projects. Any project lasting longer than one year must have a jobsite-specific summary. Either of these must be accessible to all employees and posted for the three-month period of February 1st through April 30th of each year.

### **Vehicle Accidents**

Every accident involving a company owned vehicle or privately owned car used on company business shall be reported promptly.

NOTE: In the event of a serious accident involving extensive damage, severe injury, or death outside of normal working hours contact:

Cory Goldschmidt – 920-225-6168 (work); 920-920-470-2076 (cell)

Greg Reitzner – 920/858-1428 (cell)

In the event of injury to an employee on duty or non-employee in a vehicle accident, the "Vehicle Accident Report" (Exhibit C) must also be completed and submitted. When possible, pictures need to be taken. A vehicle accident reporting packet is located in the glove compartment of all Boldt vehicles.

### **Property Damage Report**

Damage to non-company property arising out of company operations and damage to company property caused by others.

- All incidents other than personal injury must also be reported. An accident report must be submitted for damage to property during construction or operation, including damage to customer's equipment, buildings, or miscellaneous claims, in which the company may be liable. All relevant information must be submitted promptly to the corporate office. When possible, pictures should be taken and submitted along with the report.

## Damage to Company Property

- Insurance is carried on all owned buildings, contents, yard equipment, motor vehicles, mobile work equipment, and materials and supplies used in company operations. Losses must be reported to the corporate office.

*NOTE:* In the event of an incident causing serious injury, death, or an explosion involving property damage, the Safety Director shall be notified immediately. Outside of normal working hours contact:

Cory Goldschmidt – 920-225-6168 (work); 920-920-470-2076 (cell)

## **Accident Information**

If a company owned vehicle or property is involved in an accident or damaged, a report must be filed with our insurance company as soon as possible. Any information must be forwarded to the corporate office. The information required is as follows:

- Date, time, location, and description of the accident.
- If vehicle - information to be obtained for all vehicles involved: Owner and driver (name, address, age, driver's license number, home and business phone, birth date, damage to vehicle, insurance company, and location where vehicle may be seen). Vehicle #, identification #, plate #, and make of vehicle.
- If property damage (other than vehicle):

Owner's name, address and phone number, description of property and damage to that property, insurance company, and an estimate of repair.

- Injured individuals:
  - Name, address, phone, age, and description of injuries.
- Witnesses and uninjured passengers:
  - Name, address, phone number, and age.
- Other pertinent information

## **Incident Investigation**

All personnel will receive, as part of their training in avoiding and preventing accidents and injuries, instruction concerning their roles and responsibilities in the event of an accident or incident. This training should include:

- What qualifies as reportable accidents or incidents (and near-misses)
- Who should be contacted in the event of a reportable incident
- An explanation of the accident/incident investigation plan
- Incident investigation techniques and employee responsibilities during and after an incident/accident

All incidents and near misses will be properly investigated in proportion to their severity to identify and preserve evidence, interview witnesses, and through a written incident report, find the root cause, identify corrective actions, and document the changes made.

The company will report incidents to OSHA as required by law of discovery, and to owner clients within 24 hours.

The Safety Department will authorize and properly train individuals responsible for conducting incident investigations before they begin one. These authorized individuals will have the equipment they need to conduct an investigation (e.g. cameras, audio recorders, equipment manuals, marking devices, tape measures and rulers, and PPE).

Immediately after tending to any injured employees and making the workplace safe, the company will start to identify, preserve, collect and secure any potential evidence such as: list of potential witnesses, the equipment and materials involved, environmental factors (weather, lighting, temperature, noise, and ventilations) and physical factors (fatigue, age, and medical conditions). Evidence will be collected through appropriate methods (e.g. notes, video, photographs, witness statements, and flagging) and collecting documents and equipment.

Witness statements will be collected in writing, and interviews recorded individually in a comfortable space to collect detailed information according to the investigator's training. Follow-up interviews will be conducted as necessary.

A written incident report will be completed following every investigation that includes: a summary of the incident, methodology of the investigation and who conducted it, narrative of the event and any findings of lessons learned and recommendations for corrective actions, along with relevant evidence such as photographs, witness statements, and diagrams. This report will be communicated to affected employees and used to review similar operations to prevent reoccurrences of this or similar incidents.





# Vehicle Accident Report

# **BOLDT**

**INSURANCE PROVIDER:  
TRAVELERS**

**Vehicle Accident Report**

**NOTE:** Any incident resulting in **POTENTIAL Loss or Litigation** must be immediately called in to the Corporate Office at: (920) 225-6192. This form must be completed and submitted to: The Boldt Company, P.O. Box 419, Appleton, WI 54912, or faxed to (920) 225-7278 Attention: Claims.

Date of Occurrence: \_\_\_\_\_ Time: \_\_\_\_\_ AM / PM Job #: \_\_\_\_\_  
*circle one*

Location: \_\_\_\_\_

Boldt Driver's Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Were you or any of your passengers injured?  Yes  No

Vehicle/Truck #: \_\_\_\_\_ Plate #: \_\_\_\_\_ Make: \_\_\_\_\_ Year: \_\_\_\_\_

Vehicle Damage: \_\_\_\_\_

Other Parties Involved:

Owner of Vehicle: \_\_\_\_\_ Were they driving?  Yes  No

Driver's Name (if different): \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Were they or any of their passengers injured?  Yes  No

Vehicle Year: \_\_\_\_\_ Make: \_\_\_\_\_ Model: \_\_\_\_\_ Plate#: \_\_\_\_\_

Vehicle Damage: \_\_\_\_\_

Owner's Insurance Carrier: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Police Contacted:  Yes  No Were any pictures taken?  Yes  No

Name of Police Officer \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Describe the Incident: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Were there any other witnesses?  Yes  No If so, how many? \_\_\_\_\_ *Please list below or on back.*

Name(s): \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Name(s): \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

Person Completing: \_\_\_\_\_ Phone: \_\_\_\_\_

*(if different than the Boldt Driver)*

Form No. S-8 (Rev. 10/06)



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: July 22, 2001

## Aerial Work Platform

### General Requirements

#### Rules:

- Reference Aerial Work Platforms ANSI Std. A92.6-1999.
- The insulated portion of the aerial platform and safety devices incorporated into the lift must not be altered. Any modification must be approved in writing by the manufacturer.
- Lift controls and equipment must be inspected and tested each day at the beginning of each shift prior to use to verify they are in safe working condition.
- Only qualified/authorized personnel can operate an aerial platform.
- Belting off to an adjacent pole, structure or equipment while working from an aerial lift shall not be permitted.
- Employees must stand firmly on the floor of the basket, and never use ladders, planks, or other devices for an elevated work position.
- Boom and basket load limits as specified by the manufacturer must not be exceeded.
- When using outriggers (if equipped), they must be positioned on pads or a solid surface with the brakes set. Before moving for travel, the outriggers must be in the stowed position.
- Aerial platforms must be set on a firm base within three degrees of level, unless design specifications from the manufacturer state otherwise.
- Aerial platforms designed primarily as personnel carriers, must have both upper and lower controls. Upper controls must be in or beside the platform. Lower controls must provide overriding controls for use in the event of an emergency.
- Fall protection must be implemented before raising the lift excluding work performed on a scissors lift.

### Inspection/Maintenance

Prior to use each shift, the aerial platform must be given a visual inspection and functional test including the following:

- Operating manual in a weather resistant storage compartment on the lift
- Operating and emergency controls
- Safety devices
- Personal protective devices
- Air, hydraulic, and fuel system leaks
- Cable and wiring harnesses
- Loose or missing parts
- Tires and wheels
- Placards, warnings, and control markings
- Outriggers, stabilizers, and other structures
- Guardrail system

The above mentioned inspection items can be achieved on the Aerial Work Platform Inspection Report (Exhibit A). This report must be completed daily by a qualified/authorized person. Once the report is completed in its entirety (weekly) the original is to be sent to the maintenance department and the yellow copy maintained with the jobsite file.

The qualified/authorized person must immediately report any problems or malfunctions that are evident during operation. Anything which affects safe operation must be tagged and repaired before continued use.

All repairs are to conform to manufacturer’s specifications. Any modification or alteration of the aerial platform must be approved in writing by the manufacturer.

It is also important to make a workplace inspection before and during use. The employee/operator must check the area for hazards such as:

- Drop-offs or holes.
- Bumps and floor obstructions
- Debris
- Overhead obstructions
- Hazardous locations
- Surfaces which will not support the load imposed by the lift
- Weather conditions

**Operation**

Prior to moving, repositioning, or elevating the aerial platform the operator must ensure the following:

- The lift is operated on a surface within the limits specified by the manufacturer.
- The outriggers, stabilizers, or other stability enhancing means (if equipped) are properly used.
- The guardrails are installed and access gates or openings closed.
- A personal fall protection system will be worn while working from an aerial lift and is attached to the boom or basket when operating extensible and articulating boom platforms.
- The load and its distribution on the platform and any platform extension are within the manufacturer’s rated capacity.
- There is adequate clearance from overhead obstructions (bridge cranes, sprinklers, etc.).

Aerial platforms will maintain minimum safe approach distances per the table below:

Voltage (nominal, kV, alternating current)	Minimum Clearance Distance (feet)
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1,000	45
Over 1,000	(as established by the power line owner/ operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

Prior to lowering the platform, the employee/operator must ensure the surrounding area is clear of personnel and equipment. Care must be taken to prevent entanglement of ropes, electric cords, hoses, etc. If the platform/basket or assembly becomes caught, snagged, or otherwise prevented from movement, all personnel must be removed before attempting to free the platform/basket using the lower controls.

The aerial platform must not be driven on grades, side slopes, or ramps exceeding the manufacturer's specifications. When an aerial platform is designed for elevated driving, the employee/operator must adhere to the following:

- Maintain a clear path of travel
- Maintain a safe distance from obstacles, debris, drop-offs, holes, depressions, ramps, and other hazards
- Maintain a safe distance from overhead obstacles

The aerial platform must have a back-up alarm audible above the surrounding noise level. A spotter should be used to prevent striking any personnel/objects in the immediate area.

### **Recordkeeping**

The following records must be retained for at least three years:

- Records of qualified/authorized individuals allowed operating aerial platforms. For requirements, contact the Safety Department.
- Written records (Aerial Work Platform Inspection Report) which include the date, deficiencies, corrective action, and identification of the person(s) performing the inspection.

# Exhibit A – Aerial Work Platform Inspection Report



## Aerial Work Platform Inspection Report

Inspection Date: \_\_\_\_\_

Operator Name: \_\_\_\_\_  
(Please Print)

Equipment #: \_\_\_\_\_ Type of Lift: \_\_\_\_\_

Project # / Location: \_\_\_\_\_

- INSTRUCTIONS:**
- 1) This report is to be completed prior to use. Use codes for each item listed below. All defective items shall be recorded below (comments) and reported to the on-site project manager/superintendent immediately.
  - 2) After completing the form, forward original to Maintenance Department and maintain yellow copy in jobsite file.

**CODES:** G = New or Good Condition; N/A = Not Applicable; R = Needs Immediate Repair; M = Missing (needs replacement)

Daily Visual Checks	Date	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Comments (Indicate date of repairs/corrections)
	1. Operation and Safety Manual								
2. Warning & Instruction Decals									
3. Capacity & Control Decals									
4. Controls & Emergency Down Valves operate properly									
5. All Covers & Shrouds in place									
6. Lift & Extension Cylinder Assemblies									
7. Pivot Pins & Retainers									
8. Boom(s) Condition									
9. Slave Level Cylinder & Retainers									
10. Master Level Cylinder									
11. Electrical Wires									
12. Battery Condition & Brackets and Covers in place									
13. Battery Charger Condition & properly wired w/ground									
14. Tire Condition & Inflation & Lugs									
15. Outriggers/Extendible Axles									
16. Gas & Hydraulic Tank Caps									
17. Turret Condition									
18. Platform Rails & Cages									
19. Toe Boards & Mesh Condition									
20. Control Box Assembly									
21. Platform Decking									
22. Platform Lanyard Connections									
23. Platform Mount Assembly									

Signature of operator inspecting lift:

Sun. \_\_\_\_\_

Thur. \_\_\_\_\_

Mon. \_\_\_\_\_

Fri. \_\_\_\_\_

Tues. \_\_\_\_\_

Sat. \_\_\_\_\_

Wed. \_\_\_\_\_



## **Barricades**

### **Purpose**

This procedure covers the set up and maintenance of barricades on the jobsite that will restrict entry into and/or warn employees of areas that contain safety hazards, abnormal conditions, or in which unusual operations are being performed.

### **Scope**

This procedure applies to all Boldt personnel and subcontractors working on projects where safety barricade requirements are applicable.

### **General**

Construction workers and public pedestrians have sustained serious injuries and fatalities each year due to nonexistent or improper barricading of overhead hazards, rotating-type cranes, excavators, pile driving rigs, abnormal conditions, or in which unusual operations are being performed. The use of adequate barricades is the single most proven effective safety measure in protecting workers and pedestrians in the immediate vicinity of this equipment and abnormal conditions. It is imperative that supervisors, crane operators, oilers, and craft foremen not only become cognizant of this procedure, but they are required to use it in each and every applicable situation.

### **Responsibilities**

The Project Manager/Superintendent is responsible for implementing and enforcing this procedure. The Safety Representative is responsible for monitoring compliance with this procedure.

### **Procedure**

#### 1. General Barricade Standards

- When the level of the rotating superstructure of a crane, excavator, pile driving rig, or other similar equipment is less than 7 feet above the support mats or ground level, the swing radius shall be barricaded in a manner to visually alert an employee of the hazard of being struck or crushed by the equipment.
- All crane barricades shall conform to standard handrail height requirements of 42 inches as often as is practical.
- Permanent hazard areas shall be surrounded by permanent barricades. Gates will be provided, and permanent warning signs shall be used to adequately mark the hazard.
- Temporary hazard areas shall be barricaded using appropriate yellow caution, barricade tape or rope.
- Barricades will be used to call attention to a hazard, but they offer no physical protection. Barricades are generally erected with yellow caution tape on stanchions. After they have recognized the hazard, personnel may enter these areas and proceed with caution.
- Protective barricades providing warning and physical protection from falling hazards are generally made from wooden 2-inch by 4-inch material. They can also be ½ - cable stretched tight between steel with turnbuckles. Protective barricades from fall exposures must be capable of supporting 200 pounds of downward and sideway force and meet all guardrail requirements.

- A sign or barricade tag will be used to provide personnel outside of barricaded area with important safety information. This applies to any type of barricade and shall be located on all sides. Information to include:
    - Company Name
    - Supervisor's Name & Contact Information
    - Current Date
    - Identify the Hazards
  - Imminent danger areas shall be barricaded using appropriate red barrier tape or rope. Only personnel working to eliminate the hazard may be inside the barricaded area. Any personnel who must access the red barrier tape/rope areas must have permission from the supervisor who erected the barricade prior to entry.
  - If site management determines that a crane, excavator, or pile driving rig is to be stationed at one location for long period of time, a semi-permanent type of guardrail, built from lumber or steel, shall be the most suitable and require the least maintenance.
  - For cranes, excavators, backhoes, and pile driving rigs which frequently move to different locations, it is recommended that barricades be attached to the body of the equipment. This will guarantee that the barricade will always be available and eliminate the time-consuming collection and erection of the barricades each time the equipment is moved.
2. Erection
- In either case, the barricade is utilized as a warning of the hazardous condition. It is not necessarily a physical barrier with the intent of preventing entry; it is a warning of a hazard, and all employees shall be trained in its use and proper erection.
3. Road Barricading
- Barricades across or next to a roadway will be semi-permanent wooden barricades with signs. Flashing amber lights will be required on barricades left after dark to alert vehicle traffic of their presence.
4. Employee Performance
- Equipment oilers, signalpersons, and supervisors shall not stand, talk, or perform maintenance work inside the equipment barricaded area while the operator is running the machine.
  - In order for the machine oiler, signalperson, and supervisor to gain entrance into the equipment barricaded area, they must first get acknowledgement from the equipment operator, who in turn will be responsible for securing all rotating movement of the equipment until the area is safely vacated.
  - Provided, the oiler may sit in back of the equipment operator; but at no time shall the oiler leave this position without notifying the operator, who shall comply with the above requirements.
  - Individual employees shall not be assigned the responsibility, in lieu of barricades, of warning others that may venture into the rotating structure hazard area of cranes, excavators, and pile driving rigs.
  - The equipment oiler shall assist in keeping unauthorized personnel outside of the barricaded swing area.
  - Any special deviation from the above requirements shall have joint written approval of the Project Manager/Superintendent and Safety Representative.
  - No employee shall be allowed to enter a barricaded area while the piece of equipment is operating. Also, no employee shall be allowed to take a "short cut" through a barricaded area regardless of whether or not the piece of equipment is operating.



## Compressed Gases

### Purpose

This procedure provides the guidelines to ensure adequate safety to personnel when working with or around compressed gases.

### Scope

This procedure applies to all Boldt personnel and subcontractors working on projects where handling of compressed gas requirements is applicable.

### General

Cylinders containing compressed gases at high pressures are designed to comply with strict government specifications. However, intentional misuse and/or abuse of the cylinders can result in a potential hazardous situation. The safe handling, storage, and use of compressed gases whenever facility personnel work with or around compressed gas cylinders ensure a hazard free condition.

### Responsibilities

- The Project Manager/Superintendent is responsible for implementing and enforcing this procedure.
- The Safety Representative is responsible for monitoring compliance with this procedure.

### Compress Gas Cylinder Storage

- All compressed gas cylinders shall be stored in an upright position.
- Cylinders shall be secured by a chain or other fastening device to ensure that they will not be accidentally knocked over.
- Storage locations shall be well ventilated and ambient room storage temperatures shall not be allowed to exceed 125 degrees F.
- Cylinder storage locations shall be distinctly marked with the names of each compressed gas maintained at the location. NO SMOKING - FLAMMABLE GAS signs shall be posted at all entrances to locations where flammable gases are stored.
- Each compressed gas cylinder maintained at a storage location shall be labeled with proper identification of its contents.
- All cylinders in storage shall require valve protection caps at all times except when the cylinder contents are being dispensed.
- Storage locations for oxidizing gas (e.g., oxygen) and flammable gas (e.g. acetylene) cylinders shall maintain a minimum distance of 20 ft. to separate the oxidizing and flammable gas cylinders or by a non-combustible barrier at least 5 feet high having a fire resistance rating of at least one-half hour.
- Cylinder storage areas containing flammable gases shall be stored to avoid contact with a possible ignition source. Walls of the storage area shall have a fire rating resistance of at least 1 hour, and doors shall be in accordance with NFPA 80
- Flammable gas storage areas shall be heated by indirect means (i.e., steam or hot water).
- Electrical equipment within a flammable storage area shall be in accordance with NFPA 70.
- Portable fire extinguishers consisting of carbon dioxide and/or dry chemical shall be available at the storage locations.

## TRANSPORTING COMPRESSED GAS CYLINDERS

- Compressed gas cylinders shall never be rolled, slid, or dragged from one location to another.
- To transport cylinders, only a weight approved dolly (i.e., hand truck) shall be used to allow the cylinder to be moved in a secured upright position.
- All pressure regulators should be removed, and valve protection caps should be installed prior to moving any cylinders.
- When cylinders are hoisted, they shall be secured on a cradle, slingboard, or pallet. They shall not be hoisted or transported by means of magnets or choker slings.

### Vehicle Transportation

The Department of Transportation (DOT) has established strict regulations in the transportation of hazardous materials. Boldt's primary focus is not in the transportation of compressed gas cylinders, but fall into a category of "Materials of Trade".

In order to transport the "Materials of Trade", the total weight cannot exceed 440 pounds on one motor vehicle. The following list is the most common types of hazardous materials (compressed gases) that Boldt carries on its vehicles. The weights include standard size containers.

Acetylene	86 lbs.
Oxygen	128 lbs.
Argon	166 lbs.
Compressed Gas	128 lbs.
Nitrogen	128 lbs.
LP Gas 20 lbs.	40 lbs.
LP Gas 33 lbs.	75 lbs.
LP Gas 43 lbs.	90 lbs.
Gasoline 5 gallons	36 lbs.
Diesel 5 gallons	42 lbs.
Solvent 5 gallons	40 lbs.
Petroleum	40 lbs.

The maximum weight of a DOT approved cylinder cannot exceed 220 pounds. The maximum capacity of a container for combustible/flammable liquids is 8 gallons.

### Handling Compressed Gas Cylinders

- Compressed gas cylinders shall not be used in areas where the cylinder tank may come in contact with any sparks or flames.
- Compressed gases contained within a cylinder are under extremely high pressure. Therefore, whenever gas is to be withdrawn from a cylinder, pressure-reducing valves shall be used. Under no circumstances is gas to be removed from a cylinder without the use of a pressure reducing valve.
- All cylinder connections, hoses, valves, etc., shall be inspected prior to using the compressed gas cylinder. All connections shall be tight with no leaks. The damaged and/or deteriorated cylinder, valves, couplings, hoses, etc., shall not be used.
- When opening cylinder valves, gas outlets shall always be pointed away from the user and any other facility personnel standing in the immediate usage area.
- All cylinder valves shall be opened slowly using only approved wrenches for the cylinder as provided by the supplier. NOTE: When using a compressed gas cylinder, the operating wrench shall remain on the cylinder valve at all times.
- All compressed gas-cylinder valves, couplings, hoses, etc., shall not be lubricated or allowed to

- come in contact with oil and/or grease.
- Torch handles can be purchased with flashback arrestors built-in, or flashback arrestors shall be added if not equipped.
  - Separate flashback arrestors must be added to the regulators.
  - Only experienced and properly trained persons shall use compressed gases.
  - Cylinders of compressed gases shall not be placed in areas where there may be oil and/or grease nor handled with oily and/or greasy hands.
  - After each use of a compressed gas, the cylinder valve shall be fully closed and all gas remaining in the regulator valve shall be removed, the cylinder valve cap shall be installed, and the cylinder tank shall be removed from the work area and returned to its proper storage location.
  - If the contents of a compressed gas cylinder are depleted, the cylinder valve shall be fully closed, and the valve protection cap shall be reinstalled. The cylinder tank shall be appropriately marked with an EMPTY TANK, sign and the tank shall be stored in a secured upright position. Compressed gas cylinders shall never be rolled, slid, or dragged from one location to another.
  - Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

## **DEFINITIONS**

ASPHYXIANT: A gas or an agent that produces a decrease of oxygen and increase of the carbon dioxide level in the blood stream.

FLAMMABLE GAS: A gas that is flammable when mixed with air in concentrations of 13 percent or less by volume in air.

INERT GAS: A gas that is a simple asphyxiate, which displaces oxygen in the air necessary to sustain life. Inert gases can cause rapid suffocation due to a resultant oxygen deficiency.

SMALL COMPRESSED GAS CYLINDER: A cylinder having a maximum water capacity of 1000 lb. (i.e., 120 gallons) or less. NFPA - National Fire Protection Association.

INTERNAL REVERSE FLOW CHECK VALVES: Reduce the possibility of explosion or fire, which may occur as a result of fuel gases, and oxygen becoming mixed inside the hose or regulators. It is not intended to act as a fire stop.

FLASHBACK ARRESTORS: Are designed to prevent a flashback from reaching upstream equipment. They are installed between the outlet of the regulator and the inlet of the hose leading to the torch and between the hose and the torch.

## Concrete/Masonry Construction

### General Requirements

#### Equipment and Tools:

- The riding of concrete buckets is prohibited.
- When positioning concrete buckets by crane, forklift, etc., only approved shackles or safety-type hooks are to be used.
- Concrete buckets equipped with pneumatic or hydraulic operated gates must have positive safety latches or similar safety devices installed to prevent premature or accidental dumping. Buckets must be designed to limit material from hanging up on the top and sides.
- Bull float handles must be constructed of nonconductive material or insulated to provide equivalent nonconductive protection when used near energized electrical conductors.
- Powered and rotating type concrete troweling machines that are manually guided must be equipped with a switch which shuts off power automatically when the operator's hands are removed from the handles.
- Handles of concrete power buggies cannot extend beyond the wheels on either side.
- Concrete pumping systems using pipe must be provided with pipe supports designed for 100 percent overload.
- All pipes used in pumping concrete are to be provided with positive fail-safe joint connectors and secured with safety clips or retainers to prevent separation of sections when pressurized. When air pressure and clean out plug are used to clean the transfer lines, a trap must be installed at the end of the line to prevent the plug from being accidentally shot where it can contact personnel.
- Tremies, elephant trunks, and similar conveyances must be secured with wire, rope, etc. in addition to regular couplings or connections.
- Saws must be guarded by a semi-circular enclosure over the blade and by a slotted horizontal hinged bar mounted underneath the enclosure to retain fragments if the blade shatters in use.

#### Personal Protective Equipment (PPE):

- Saw operators must wear approved safety goggles or face shield with approved safety glasses.
- Employees cutting concrete or masonry must follow Boldt's Respiratory Crystalline Silica Program.
- When pouring concrete, employees must take necessary precautions (i.e.: rubber boots) to avoid prolonged skin contact with concrete.

#### Protective Systems:

- Belts, gears, shafts, etc., or other moving parts which employees may contact must be guarded to prevent that exposure.
- Equipment which needs modification or repairs must be at zero energy potential (ZEP), locked, and tagged out before servicing.
- People must be kept out from under suspended concrete buckets.
- When feasible, elevated loads (concrete buckets) must be routed so that no, or the fewest amount of employees, are exposed to the hazard of the load falling.
- Loads cannot be placed on concrete structures unless it is determined by a qualified person in structural design that the structure is capable of supporting the loads.
- Fire protection consisting of water hoses and/or fire extinguishers must be provided for operational heating equipment being used for concrete curing.

- Any temporary enclosures must be provided with adequate light and ventilation for the safety of employees.
- Temporary heating devices are to be installed, tested, operated, and maintained in accordance with the manufacturer's specifications. When employees are exposed to temporary heating devices, depending on air flow/exchange, the air must be periodically monitored for carbon monoxide.
- Employee's working six feet or more above an adjacent working surface must use some type of fall protection (guardrail system, harness, and lanyard, etc.).

#### Scaffolding:

- All scaffolding used in conjunction with concrete/masonry construction must conform to Boldt's Scaffold Safety Program.

#### **Concrete (Specific)**

##### Reinforcing Steel:

- Employees cannot work around protruding reinforcing steel, or any other similar objects, that could cause impalement unless adequately protected to eliminate the hazard of impalement.
- Reinforcing mats used as a walkway must be provided with planking to afford footing.
- Bundles of reinforcing steel moved by crane or cableway are to be tied together to prevent slipping. Bundles over twenty feet in length shall be handled by spaced two-part slings or chokers.
- Vertical structures must be guyed and supported to prevent collapse.
- Wire mesh rolls must be secured at each end to prevent a recoiling action. Both sides must be secured prior to cutting the mesh.
- The use of reinforcing steel as guy attachments at dead men anchorage points is prohibited.
- The use of reinforcing steel as hooks or stirrups for scaffolding or use as a load bearing member of any lifting device is prohibited.

##### Shoring/Re-shoring:

- All equipment must be inspected prior to erection to determine if it meets the drawings requirement specifications.
- Equipment found damaged or defective must be tagged and not used as part of the shoring system.
- The sills/plates for shoring must be capable of carrying the maximum intended load.
- Base plates, shore heads, extension devices, and adjustment screws must be in firm contact and secured with the foundation and the form when necessary.
- After erection, shoring found to be damaged or weakened must be reinforced.
- Prior to, during, and immediately after placement of the concrete, the shoring must be inspected by a qualified person.
- Eccentric loads on shore heads must be prohibited unless designed for such loading.
- Single post shores when tiered must also meet the following requirements.
  - a. Design of shoring must be prepared by a qualified person and inspected by a qualified structural engineer.
  - b. Single post shores must be vertically aligned.
  - c. Single post shores must be spliced to prevent misalignment.
  - d. Single post shores must be braced in two perpendicular directions at the splice level. Each tier must be diagonally braced in the same two directions.
- After placement of concrete, single post shores cannot be adjusted to raise formwork.

- Whenever concrete is required to support loads in excess of its capacity, re-shoring must be erected as original forms and shoring are removed.
- Re-shoring cannot be removed until the concrete has attained the strength to support its weight and the weight of any loads placed on it.

#### Formwork:

- Formwork must be designed, fabricated, erected, supported, braced, and maintained so it will be capable of supporting without failure all vertical and lateral loads reasonably anticipated to be applied to it.
- Drawings, including all revisions, must be available at the jobsite.
- Prior to, during, and immediately after placement of the concrete, the formwork must be inspected by a qualified person.
- When the forming and stripping operations of formwork cannot be done from the floor, ground, or other solid construction, then ladders, scaffolds, or other means of access must be used.
- When placing and removing forms, employees at lower levels must be protected from falling materials by warning signs, barricades, or overhead protection along walkways.
- Forms cannot be removed until the employer determines that the concrete has gained sufficient strength to support its weight and superimposed loads.

#### Precast Concrete:

- Wall panels, structural framing, etc. must be supported to prevent collapse until completion of permanent connections.
- Tilt-up concrete lifting inserts must be capable of supporting at least two times the maximum intended load.
- Lifting inserts other than tilt-up members, must be capable of supporting at least four times the maximum intended load.
- Lifting hardware must be capable of supporting five times the maximum intended load.
- Employees are prohibited from working under precast concrete members being lifted or tilted into position unless actually required for erection.

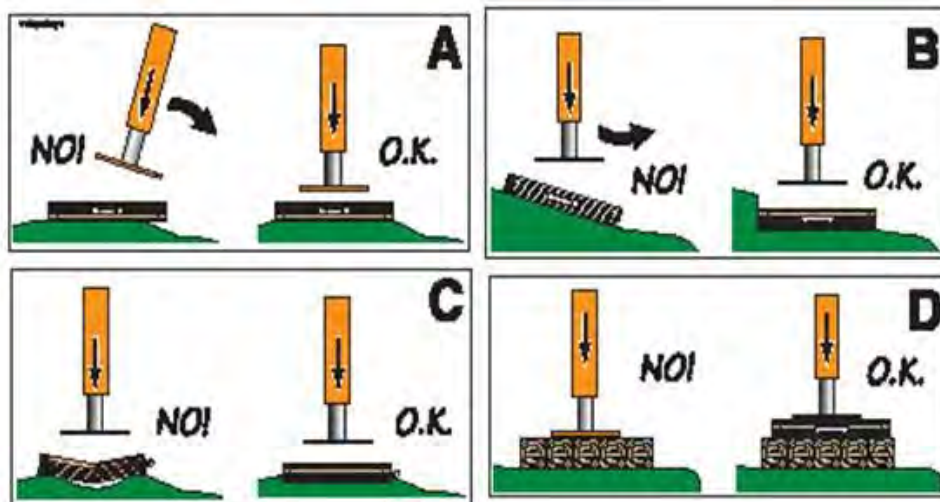
#### Pump Truck/Conveyor Trucks:

- Special attention must be paid to concrete pumper trucks and conveyors. The OSHA standards are very limited, therefore individual manufacture's operation, maintenance, and parts manual along with guidelines established by Concrete Pump Manufacturers Association and the American Concrete Pumping Association Safety Manual will provide safety expectations.
- Correct pumping operations, hose whipping, stability and ground support hazards such as tipping hazards, improper outrigger positioning, and inadequate soil conditions are among the greatest hazards that can be present.
  1. Pumping operations: Always follow manufactures safety guidelines.
  2. Hose whipping: Air ingestion to concrete pumping delivery pipelines has revealed itself as a considerable hazard under certain circumstances. Injuries to placing crew personnel have been sustained when trapped air is momentarily compressed, then released, causing the end hose to whip violently. To avoid injury by a hose moving from release of trapped air, personnel must be out of the end-hose movement area. Because the conditions creating the hazard (air is being pushed by the material being pumped) don't usually result in hose whipping, knowing when the hose will whip is not feasible. It is possible, however, to be aware that the conditions creating the hazard are present and warn personnel in the discharge area to remain away until the conditions no longer exist. (Make everyone aware of potential hazards.)

3. Tipping accidents have occurred as a result of:
  - a. Inadequate cribbing
  - b. Misjudging the soil
  - c. Soil not compacted
  - d. Setting up too close to excavations or backfilled areas
  - e. Hidden voids
  - f. Wash outs
  - g. Natural or man-made voids

Setting Outriggers:

- Setting the outriggers of a concrete pump with placing boom is one of the most critical jobs of the concrete pump operator and should always be done in accordance with the manufacturer's recommended procedure. If not done properly, it can lead to a serious accident.
- When arriving at the jobsite, always check-in with the controlling contractor. Talk with the superintendent or foreman regarding where to set up safely. Always use the factory-supplied cribbing pads or more, no matter what the surface, even if it is on concrete. If jobsite conditions do not allow full extension of all outriggers and you are required to short rig, be sure that you understand all of the rules. If you do not understand the rules, do not set up!
- When laying cribbing, spread the load. Special attention should be taken to assure support on the side that will feel the weight of the boom. Walk around the unit and center the outrigger pads and crib directly under each outrigger foot pad.



- Electrical hazards associated with concrete pump truck/conveyor truck: The United States Department of Labor has made a change to the Federal Code of Regulations regarding crane safety. Concrete pumps are specifically excluded from the new regulations. In spite of this, the hazards for cranes and pumps are similar, including booming into power lines. Like cranes, the number one cause of fatal accidents with pumps is electrocution. Accordingly, the American Concrete Pumping Association has decided to adopt the crane regulations regarding safety near power lines. (OSHA will enforce the general duty clause based upon manufacture guidelines for pumper trucks. Therefore, CFR 29 1926.1408 must be followed.)

## **Masonry (Specific)**

### Storage:

- All materials stored in tiers must be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse.
- Material stored within buildings under construction cannot be placed within six feet of any hoist way or inside floor openings, nor within ten feet of an exterior wall unless the wall extends above the top of the stored material.
- Loose bricks cannot be stacked more than seven feet high. When a loose brick stack reaches a height of four feet, it must be tapered back two inches in every foot of height exceeding the four foot level.
- When loose masonry blocks are stacked higher than six feet, the stack must be tapered back one-half of the block height per tier above six feet.

### Limited Access Zones (LAZ):

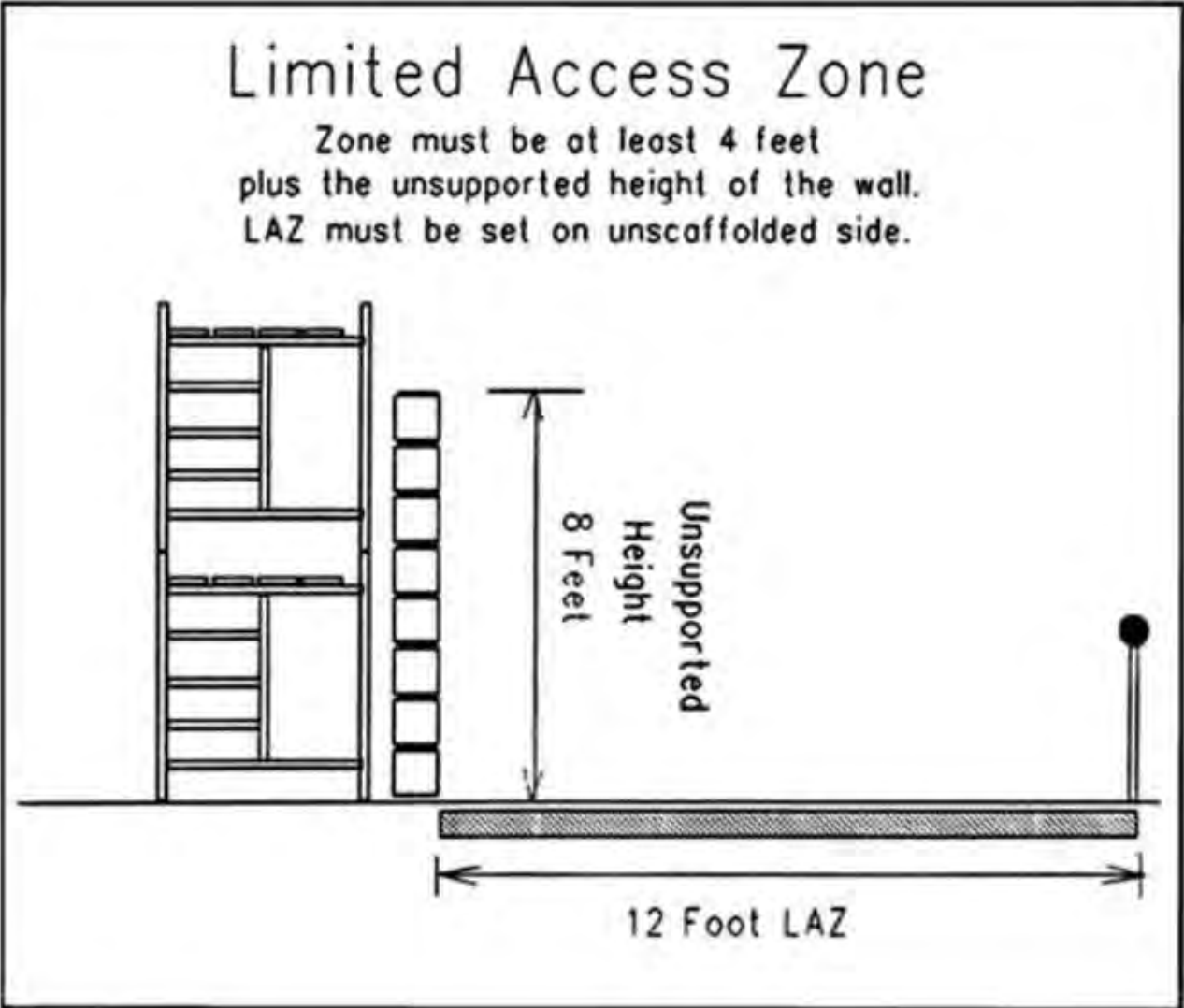
- LAZ is the area alongside a masonry wall which is under construction and identified to limit access by employees.
- When constructing a masonry wall, the following must be conformed to:
  - a. The LAZ must be established prior to the start of wall construction.
  - b. The LAZ must be equal to the height of the wall constructed plus four feet, and run the entire length of the wall (Exhibit A).
  - c. The LAZ must be established on the un-scaffold side of the wall.
  - d. The LAZ must be restricted to only employees constructing the wall.
  - e. The LAZ must remain in place until the wall is adequately supported by bracing and/or securing in place by means of roofs, floors, buttresses, cross walls, and piers to prevent overturning and collapse.
- The LAZ must be marked by one of the following:
  - a. Fence
  - b. Barricades
  - c. Caution tape
  - d. Signs with warning line (rope, chain, etc.)
- The LAZ may be reduced to the height of the un-braced wall plus four feet once adequate bracing has been accomplished (Exhibit B-D)

### Bracing:

- All masonry walls over eight feet in height must be adequately braced to prevent overturning or collapse. The bracing must remain in place until permanent supporting elements of the structure are in place.
- On walls over eight feet, the LAZ can be reduced to the un-braced height plus four feet but at no time can there be more than a maximum of eight feet un-braced (Exhibit E).
- Walls over eight feet in height do not require a LAZ when fully braced (Exhibit F).
- Exterior wall bracing cannot be spaced at intervals of more than 20 feet. Cross walls are acceptable instead of bracing for interior walls as long as they do not span more than 20 feet apart.
- All bracing must be designed to withstand a velocity of 35 miles per hour. If the wind velocity is more than 35 miles per hour, no one is permitted within the potential collapse area. After the storm, the wall must be inspected for damage by a qualified person. If damaged, only person(s) repairing the wall are permitted in the area until repairs are completed.



**Exhibit A – Limited Access Zone 1**



**Exhibit B – Limited Access Zone 2**



Exhibit C – Limited Access Zone 3

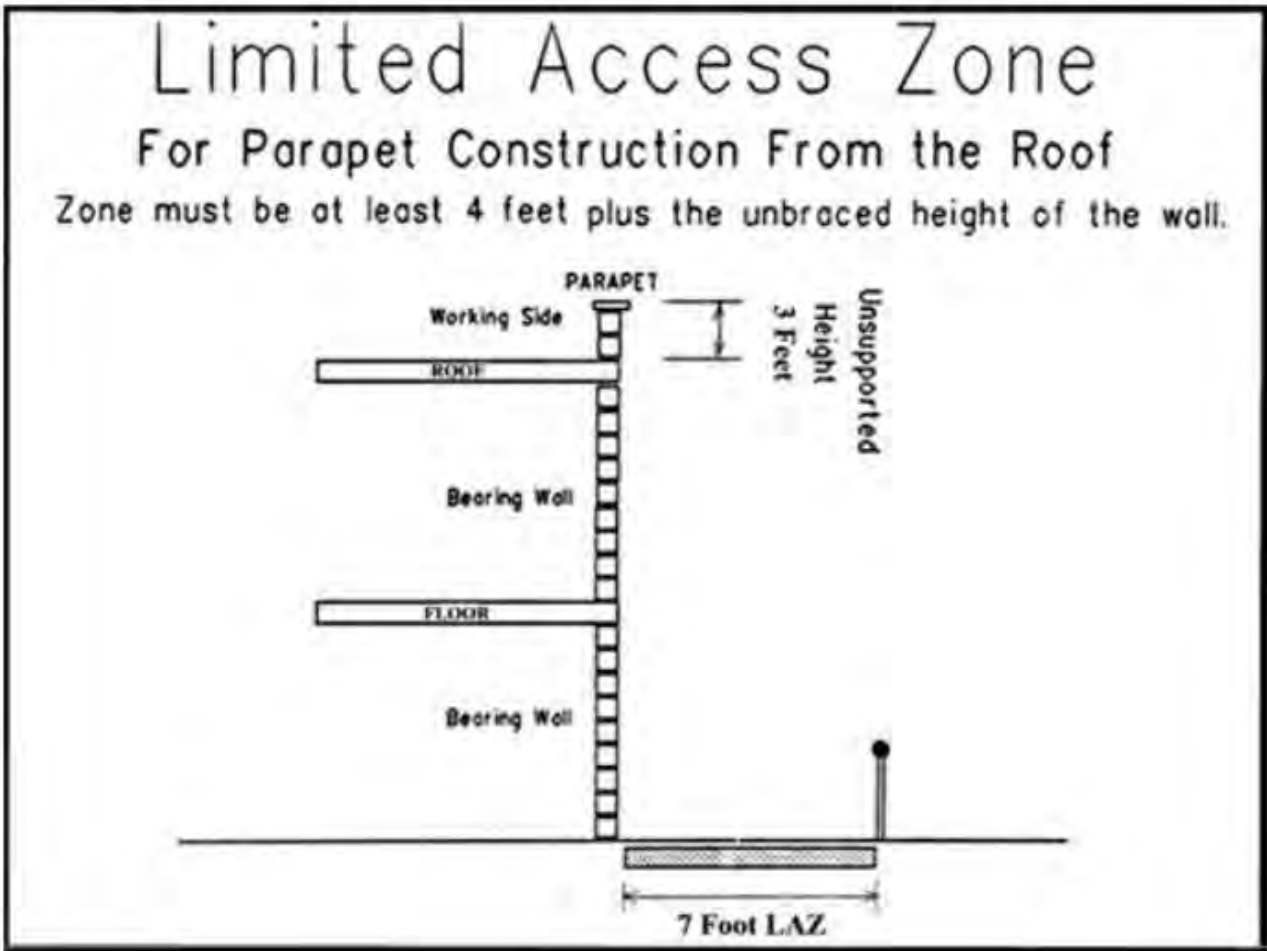


Exhibit D – Limited Access Zone 4

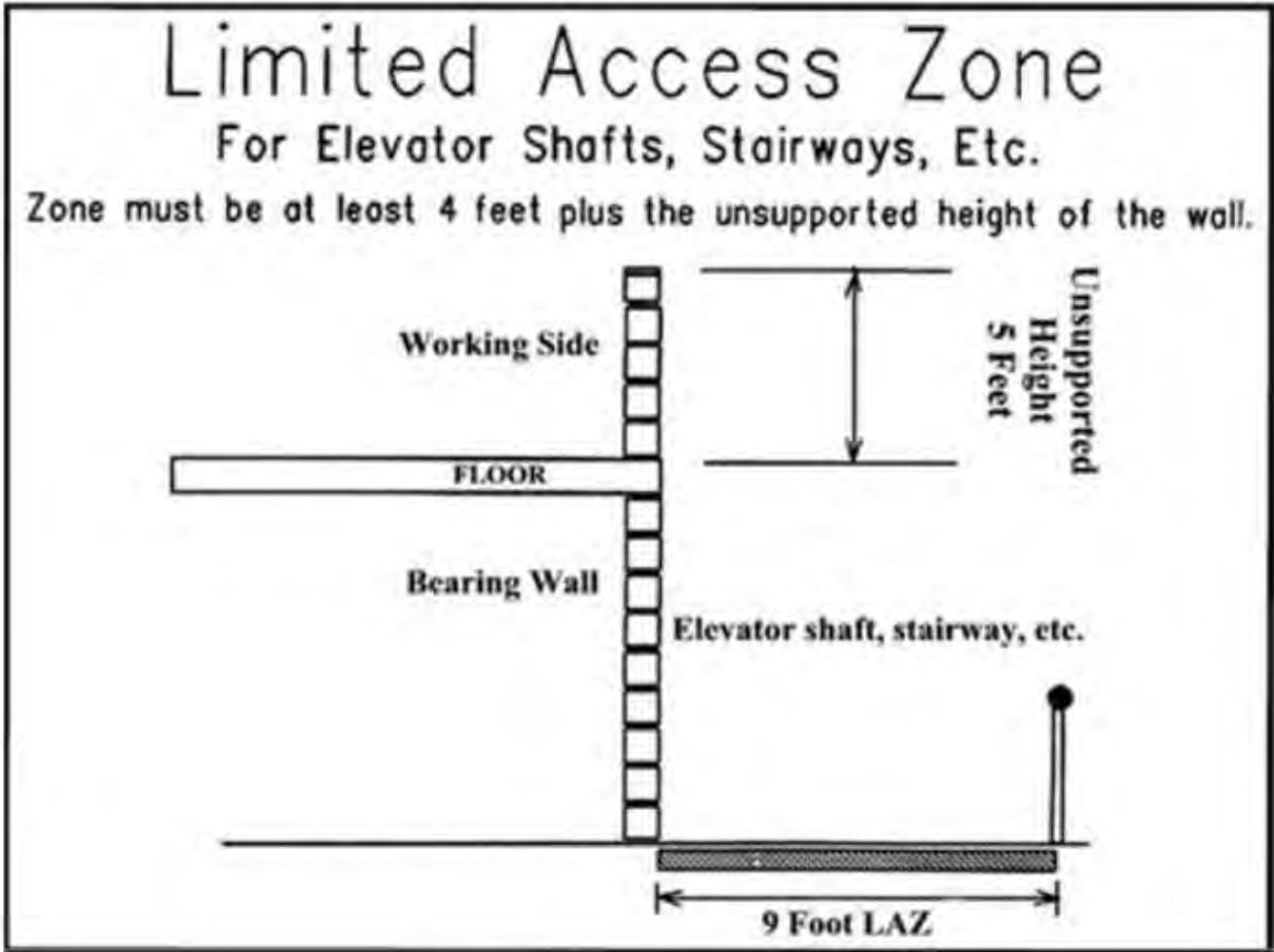
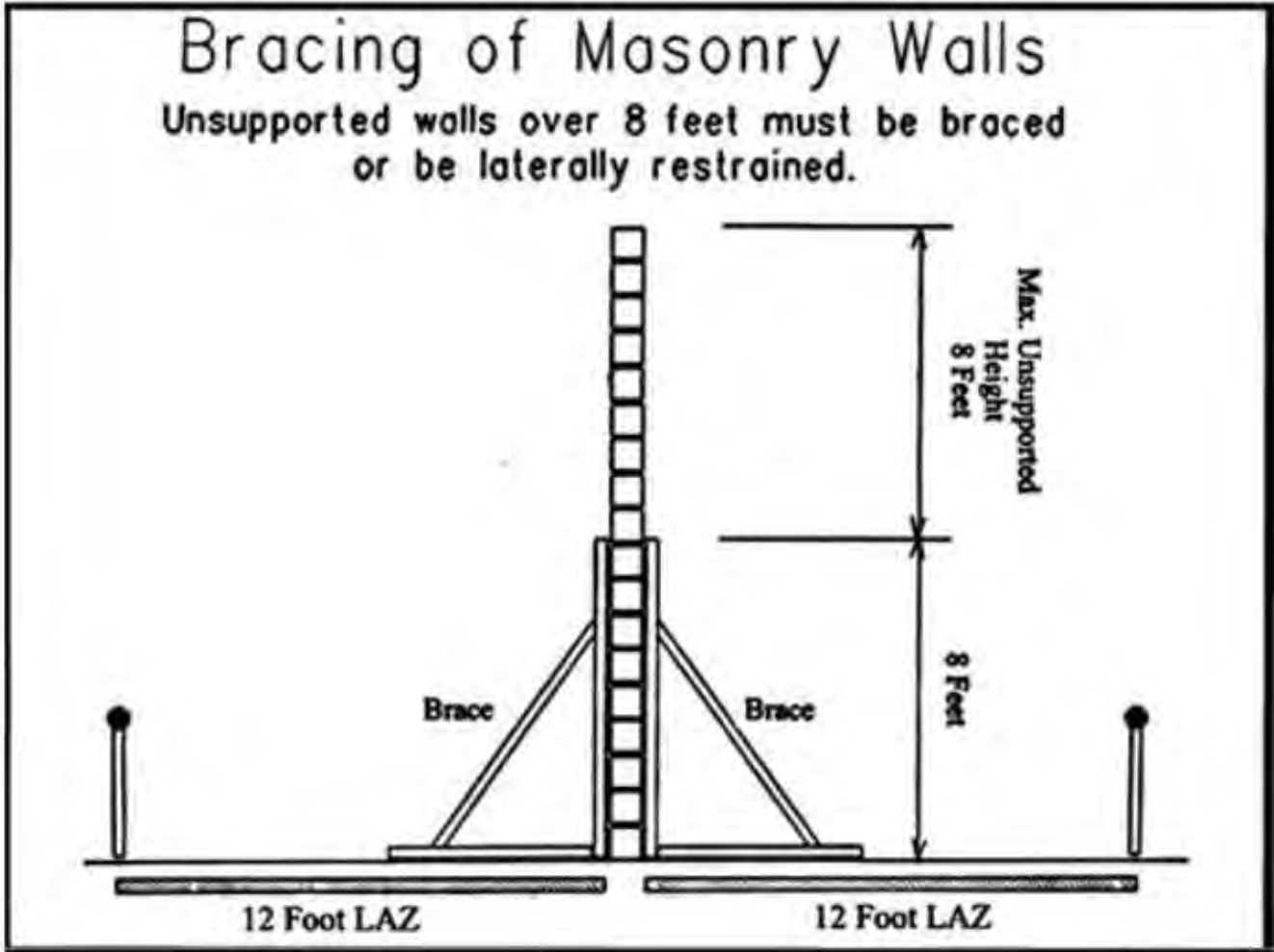
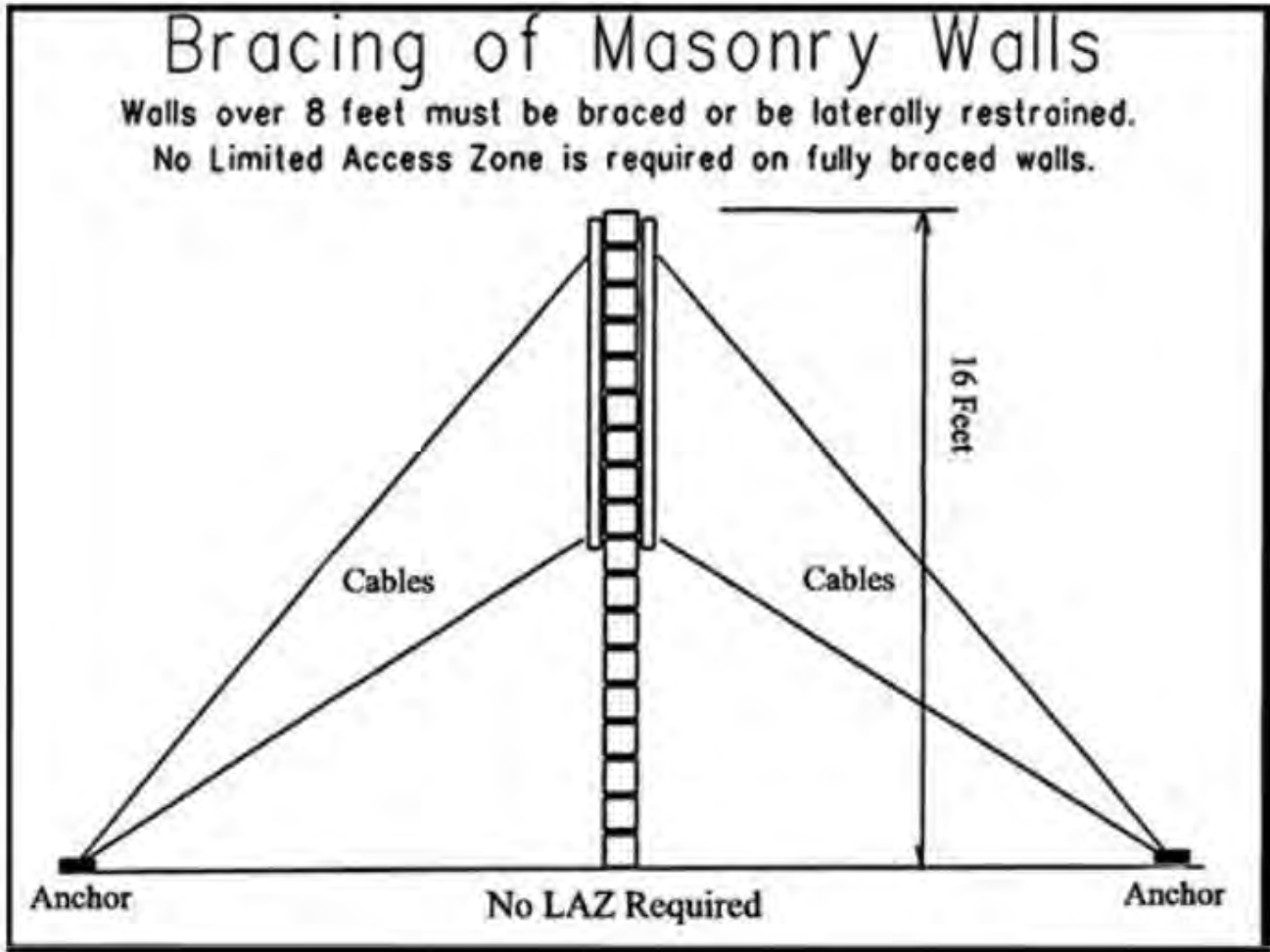


Exhibit E – Limited Access Zone 5



**Exhibit F – Limited Access Zone 6**





## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: November 1, 2013

## Crane Operations

### Purpose

This written Crane Operation Policy will establish guidelines to be followed whenever any employees or subcontractors work with cranes or derricks on Boldt managed projects. This Safety Policy is written to comply with the OSHA regulations and to endeavor to maintain a safe and injury/illness/incident free workplace. This policy shall be readily available for review at all times. Compliance with this Safety Policy and all items contained therein is mandatory for all employees and subcontractors. The rules are established to: provide a safe working environment; govern operator use of cranes and derricks; ensure proper care and maintenance of cranes and derricks; and prevent property/equipment damage.

These procedures establish uniform requirements designed to ensure that crane and derrick safety training, operation, and maintenance practices are communicated to and understood by the affected employees. These requirements are also designed to ensure that procedures are in place to protect the health and safety of all employees.

The criteria and standards for the safe operation of cranes shall include the following:

1. Manufacturer's recommendations and requirements
2. American National Standards Institute (ANSI)
3. American Society of Mechanical Engineers (ASME)
4. Occupational Safety and Health Administration (OSHA)

**Note:** Where the project is located in a state that has its own regulatory agency such as California's Division of Occupational Safety and Health Administration (Cal-OSHA), the crane equipment along with operational guidelines must meet the requirements of the state agency. The states in which a license is now required are: California, Connecticut, Hawaii, Maryland, Massachusetts, Minnesota, Montana, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, Utah, Washington and West Virginia. All crane operator license requirements will become effective in all Federal OSHA jurisdictions on the date specified by the final rule 29 CFR Subpart CC – Crane and Derricks in Construction - 1926.1427.

These criteria are the minimum standards that must be met in all crane operations on all Boldt Company projects. This crane safety policy does not necessarily restate all of the rules and regulations, but should be used for clarification and additional criteria to be adhered to while operating crane equipment on Boldt projects.

## DEFINITIONS

A/D director (Assembly/Disassembly director): an individual who meets this subpart's requirements for an A/D director, irrespective of the person's formal job title or whether the person is non-management or management personnel. Must meet OSHA requirements for a competent person and qualified person.

Competent person: one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Controlling entity: an employer that is a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project--its planning, quality and completion.

Crane safety team: all members participating in the planning of the safe lift.

Dedicated spotter (power lines): To be considered a dedicated spotter, the requirements of § 1926.1428 (Signal person qualifications) must be met and his/her sole responsibility is to watch the separation between the power line and the equipment, load line and load (including rigging and lifting accessories), and ensure through communication with the operator that the applicable minimum approach distance is not breached.

Lifting Superintendent: is the Boldt Company representative responsible to directly oversee the crane lifting operation.

Nationally recognized accrediting agency is an organization that, due to its independence and expertise, is widely recognized as competent to accredit testing organizations. Examples of such accrediting agencies include, but are not limited to, the National Commission for Certifying Agencies and the American National Standards Institute.

Project Superintendent: the Boldt Company representative responsible for projects execution.

Qualified person: a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Qualified rigger: a rigger who meets the criteria for a qualified person.

Qualified signal person: The employer of the signal person must ensure that each signal person meets the Qualification Requirements. They include knowing and understanding the type of signals used. If hand signals are used, the signal person must: know and understand the Standard Method for hand signals; be competent in the application of the type of signals used; have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads; demonstrate that he/she meets the requirements in the OSHA standard through an oral or written test, and through a practical test.



## Crane Safety Team Responsibilities

The key to a successful lift is team involvement and bringing together information and people to ensure that the lift is planned properly, supervised appropriately, and carried out safely.

### Project Manager

The Project Manager's duties are to include the following:

- Ensure all duties are expressly assigned to Crane Safety Team members.
- Being familiar with the relevant parts of the Boldt Safety Manual in addition to federal, state and local regulations where lifting operations are to be carried out on project locations.
- Ensure that the lifting operations include planning, selection of cranes, lifting accessories and equipment, instruction and supervision as is necessary for the task to be undertaken safely.
- Ensure that adequate inspection / examination and maintenance of the equipment have been carried out prior to its use.
- Establish an effective procedure for reporting defects and incidents and taking necessary corrective action.
- Takes responsibility for the organization and control of the lifting operation.
- Ensure the Project Superintendent is engaged in the planning and implementation of the "Safe Lift Plan" and understands the expectation.

The Project Manager is able to delegate his duties to another person (Field Engineer) but the responsibilities still remain with the Project Manager.

### Project Superintendent

The Project Superintendent shall be responsible for the identification and assignment of specific tasks involved in providing equipment and completing the job in a safe and efficient manner. To do this, one must follow all guidelines and regulations regarding cranes and rigging and relay that information to everyone involved before the operation begins.

The Project Superintendent shall be responsible for providing a well-prepared work area before the crane arrives on the job. This ensures that:

- Access roads are adequately prepared
- There is room to assemble and disassemble boom
- Grades are level and soil compacted
- There is adequate clearance from overhead power lines and other obstructions

The Project Superintendent shall be responsible for scheduling of the crane and crane competent person (Operator/Assembly-disassembly Director) with sufficient notice to provide for site safety considerations. Based upon the information in the "*Crane Selection & Setup Analysis*" (*Exhibit A*) and information provided by the crane competent person/operator/lifting superintendent using and the "*Safe Lift Plan*" (*Exhibit B*), the superintendent may also refuse to allow any crane to proceed to operate until such time that the unsafe condition can be eliminated. The Crane Selection & Setup Analysis should be completed during the planning stages when selecting a crane for a project. Information on this form should be completed to the best of the crane requester's ability and sent to the equipment manager for processing. If the chosen crane is a lattice boom crane, the Crane Selection & Setup Analysis form will be sent to the Assembly Director to verify configuration. The completed form should be left in the three ring binders located in the crane. The "Safe Lift Plan" should be completed daily for the heaviest expected lift at the maximum lift radius anticipated. The Project Superintendent will assess each situation and provide full support to eliminate unsafe conditions to determine if the lift can be made safely. The Project Superintendent has complete authority and responsibility to cease any crane activity or operation on the project which does not comply with this policy and procedures. When a crane operator declines to make a lift based on any safety concerns,

(“Stop work authority”), a Boldt or subcontractor “Qualified Person” will be required to review the lift plan and determine that safety has been assured.

The Project Superintendent is responsible for completing, delegating, coordinating or obtaining from subcontractors, the required operator’s evaluation documentation.

#### Assembly/Dis-Assembly Director

The crane Assembly Dis-assembly Director is the party responsible for bringing the crane onto the jobsite and controlling the erection/set-up of lattice boom cranes.

The Assembly/dis-assembly Director assures:

- that the erection and/or dismantling procedures which were provided by the manufacturer of the crane are implemented and adhered to
- that the Post Assembly Crane Inspection Report (Exhibit E) is completed prior to the initiation of the crane operation in addition to whatever load tests and/or certification may be required;
- that the operator and/or oiler fully understand the crane’s controls and capabilities to operate the class of machine to which they are assigned
- that the certifications (crane owner responsibility) of the crane are in accordance with the Boldt Crane Operation Policy and regulatory requirements, and that the on-going inspections are maintained

#### Lifting Superintendent

The Lifting Superintendent’s role is to direct and supervise the lifting operation and ensure that all lifting operations are carried out in accordance with the Boldt Crane Operation Policy as well as federal, state and local regulations.

The Lifting Superintendent should be competent and suitably trained and must be experienced to carry out all relevant duties. The Lifting Superintendent has authority and responsibility to stop the lifting operation if he considers it dangerous to proceed.

The Lift Superintendent is responsible for:

- assuring that a copy of the lift plan is current, present in the work area, and signed off in accordance with the Safe Lift Plan
- assuring that each of the other parties, e.g., riggers, operators, and signal persons, understand their functions
- Assuring that a signal person is assigned for all lifts. If multiple signal persons are required, a thorough briefing on the transition between signalers with the crane operator is understood
- Addressing the outrigger area of dual responsibility by assigning the responsibility for the work in setting up the outrigger supports as well as the suitability of the outrigger setup. Riggers usually set the outrigger supports and, if required, do the manual work in positioning the outriggers themselves. This outrigger work is done with the cooperation of the operator who determines the outrigger configuration from the load chart

#### Crane Operator

The certification of a crane operator (CCO) is preferred and may be a condition of employment by the client/owner. This certification will weigh heavily on whether an operator meets the necessary criteria to operate Boldt equipment. All crane operator license requirements will become effective in all Federal OSHA jurisdictions on the date specified by the final rule 29 CFR Subpart CC – Crane and Derricks in Construction - 1926.1427.

The crane operator is responsible for the correct operation of the crane in accordance with the manufacturer's instructions and within the safe work procedures established with this policy.

The operator shall assume responsibility from the moment the cab is entered, or the controls are energized. The operator also has an additional obligation to understand the machine and its limits. An operator shall be trained based upon industry expectations and shall oversee the training and supervision of an oiler, if the situation warrants it. The operator's manual and load chart must be available to the operator at the control station at all times. Manufacturer's specifications and procedures applicable to the operation of any crane or lifting device shall be complied with. Understanding the operator's manual and being able to determine the crane's actual net capacity for every possible configuration are essential.

An operator shall be aware of their responsibilities and accept them. The operator will be given "Stop work authority" and shall refuse to lift when hazards or unsafe conditions exist. Report these immediately to the supervisor. Always know the site conditions (e.g., weather conditions, obstructions). Select the correct equipment for the lift and know the proper load and rigging procedures. Choose the proper signal person and communication. Always stay in sight of the lift, when possible, and/or have direct communication. Radio contact shall be an acceptable means of communication, but the frequency shall be separate from all other frequencies used on the project. Operation shall be in a smooth, controlled and safe manner. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be readily available or posted on all equipment. Instructions or warnings shall be visible from the operator's station, not limited to crane angle indicators and boom extension indicators.

The crane operator is to respond to a single signal person at any given time and that person must be identifiable to the operator. Should any person near a lifting operation give the recognized stop signal, the operator must cease lifting operations immediately and confirm what actions are required from the assigned signal person. The crane operator must have a pre-determined means of verbal communication with the oiler at all times.

#### Crane Operator Evaluations

Operator possession of a certificate, license, or degree by itself does not qualify an operator. A certified operator must pass an employer evaluation in order to operate a crane:

- Evaluations require the operator to demonstrate the skills and knowledge, as well as the ability to recognize and avert risk, necessary to operate the equipment safely, including those specific to the safety devices, operational aids, software, and the size and configuration of the equipment. Size and configuration include, but not limited to, lifting capacity, boom length, attachments, luffing jib, and counterweight set up.
- Evaluations must also include the operator's ability to perform the hoisting activity for the assigned work, including (if applicable), blind lifts, personnel hoisting, and multi-crane lifts.
- The evaluation must be conducted by someone possessing the knowledge, training, and experience necessary to assess equipment operators. This will be an employee of the employer or agent of the employer. If an agent is delegated, the employer is still ultimately responsible for ensuring the evaluation is properly conducted.
- Evaluations must be documented and available at the operator's work location throughout the employment of the operator. Evaluations shall include: operator name; date of evaluation; the make, model, and configuration of the crane; evaluator signature.
- Once the evaluation is completed successfully, the employer may allow the operator to operate other equipment that the employer can demonstrate does not require substantially different skills, knowledge, or ability to recognize and avert risk to operate.

- Re-evaluations must be conducted whenever: retraining is provided to an operator; when you believe it necessary based on the operator's performance; to re-evaluate operator's knowledge.
- All subcontractor and third party supplied operators shall be evaluated by a subcontractor or third-party evaluator. All evaluation documentation shall be provided to Boldt prior to the operator operating the crane.

### Crane Oiler

Essential job functions include: mobilize crane to various construction sites and assist in setting up crane; mechanical and construction knowledge of machines and tools, including their designs, uses, repair, and maintenance; identify objects, actions, and events by categorizing, estimating, recognizing differences or similarities and detecting changes in circumstances/events; start machines and observe mechanical operation to determine efficiency and/or detect problems; dismantle and remove parts for repair using hand tools, chain falls, jacks, cranes, or hoists; maintain clean, orderly environment adhering to company policies and industry regulation/standard(s) (OSHA, NCCCO, etc.); and attend vendor and in-house training and participate in certification programs as necessary.

An oiler shall not operate any crane equipment unless he/she possesses the qualifications of a bona fide crane operator as defined above. This limitation does not include positioning of the crane during relocation, assembly/ disassembly or during routine performance of his or her general maintenance duties. An oiler may operate the crane only while under the direct supervision of the qualified operator. Any crane oiler who determines that a lift is unsafe to be performed shall notify the Operator immediately. They shall consult with the Boldt project superintendent in order to create a safe plan of action.

Communication is the key to employee safety – the oiler must not go into a blind spot within the swing radius on the crane without first verbally communicating his/her intentions to the operator. The operators will not swing the crane until the oiler has verbally communicated that he/she has completed their work task and has left the swing radius area.

Remember – “If you can't see the operator, the operator can't see you.”

### Qualified Signal Person

The qualified signal person is responsible for the safe movement of the crane and clear direction must be given whether visual or hand signals.

Under the supervision of the Lifting Superintendent, signaling personnel are responsible for:

- the stability of the load, requirement for tag lines, and load pick-up and set down procedures
- signaling or directing the movement of the load by communication with the Operator and the receiver of the load
- where multiple signalmen are utilized, a means of communication must be provided between them and the crane Operator, to assure a smooth transition
- assisting and informing the Operator in maintaining clearance from obstructions and in confirming the stability of the crane

### Qualified Rigger

The qualified rigger is responsible for the attaching and detaching of loads to and from the crane load lifting attachment and ensuring that the correct accessories are used for that operation in accordance with the planning of the operation.

Under the supervision of the Lifting Superintendent, rigging personnel are responsible for:

- inspect all rigging components prior to use
- the rigging function from the bowl of the hook downward
- verifying the actual weight of the load and communicating this information to the Operator
- attaching (rigging) the load using suitable lifting gear
- positioning other rigging personnel as required
- landing/placement of the load
- assisting in the placement of cribbing or blocking under the crane or its outriggers and generally assist in the crane set-up
- the qualified rigger is to store lifting accessories in a suitable place when not being used and prior to re-using an accessory he must visually inspect it before use
- The qualified rigger must notify the lifting superintendent of any damaged equipment immediately

### Safety Professional

The safety professionals are a resource to provide technical assistance and to assure that the Boldt Crane Safety Team members follow the Boldt Crane Operation Policy as well as federal, state and local regulations. Documentation of compliance is accomplished by completion of the exhibits in the Crane Operation Policy. The safety professional will assure that these exhibits are completed and entered into the appropriate Boldt Job Files.

The safety professional's responsibilities include:

- assuring that certifications for all cranes on site are current
- assuring that required inspections are current and that noted remedial action is completed
- assuring that safe lift plans are completed properly
- maintaining a site plan which reflects work areas and travel paths for all cranes
- Reviewing and maintaining lift plans for all lifts on site to assure proper approvals have been maintained throughout lifting procedures

### Field Engineer

The Field Engineer may be delegated the responsibility to oversee lifting operations by the Project Manager. When given this responsibility the Field Engineer will:

- help to complete the Lift Data Sheet for Engineered lifts
- be fully aware of the requirements of the Lift Data Sheet as well as provisions of the Site Safety Plan that may impact crane operation for the lift
- understand Operator's responsibilities as defined in the Crane Operation Policy
- be aware of the lift plan for the lift in question, be it an Engineered Lift Plan, a Production Lift Plan or a Routine Lift Plan and understands safety concerns imposed by the plan
- be aware that the lifting operation for the lift in question should not proceed if it does not conform to the Lift Data Sheet and that deficiencies or deviations in these lift plans will be reported immediately to the Project Superintendent or Project Manager

### Subcontractors

All subcontractors shall be responsible for providing The Boldt Company Project Superintendent with the scheduled crane arrival time, general crane information such as type, size, and owner, anticipated lifts, and any lift plans a minimum of 24 hours prior to scheduled arrival date of the crane. Prior to beginning any work with a crane, the subcontractor shall provide The Boldt Company with a completed "*Crane Selection & Setup Analysis*" (Exhibit A) form & "*Safe Lift Plan*" (Exhibit B) form with a plan of action for items requiring corrective measures. The subcontractor shall ensure that each item requiring corrective actions or measures are addressed prior to making lifts with the crane. The subcontractor shall ensure that the crane and its crew are working within the guidelines set forth by the

governing authorities and The Boldt Company at all times. Any delays or down time due to the determination or correction of any crane safety deficiency shall be at the subcontractor's expense. The subcontractor shall ensure that they have provided The Boldt Company management staff with a "Certificate of Insurance" as per contract requirements. All subcontractors are responsible to evaluate their (subcontractor is the employer) crane operators. Subcontractors must ensure that operators contracted through their subcontractors have completed an evaluation and provide all documentation to Boldt.

## **Lift Plans**

Communication is the key to a safe crane lift. Any lifts can range from simple to very complex. All crane lifts require some level of planning, whether the load is a mere half-ton or more than 2,000 tons. All lifts require knowledge of the weight of the load (and other components considered to be part of the load), the configuration of the crane, the rated capacity of the crane at its lift configuration, and factors that may affect the crane's rated capacity in order to make a lift safely.

### Routine Lift Plan

For example, the unloading of miscellaneous supplies or the delivery of lumber to a carpenter crew would be considered routine lifts. Routine lifts may all be covered by one lift plan that outlines the parameters and the equipment to be utilized as well as the procedures. If the crane is in the process of lifting on a "Production Lift Plan" and the occasion arises to make a routine lift – a secondary lift plan is not required.

The routine lift plan requires:

- Complete "Safe Lift Plan" (Exhibit B) to assure safety procedure are addressed;
- Holding pre-lift meetings to discuss the rigging and lift requirements;
- Providing continuous qualified supervisor, and experienced operator supervision during the setup and/or during lift.
- Limiting equipment use to operators who are specifically qualified for the crane in use.
- Providing qualified riggers.
- Providing certified signalers.
- Inspecting all rigging components.
- Keeping all unnecessary personnel out of lifting areas.

### Production Lift Plan

Production lifts are repetitive and do not fall into the classification of a routine lift or an engineered lift. For example, lifting miscellaneous structural steel or precast members of similar sizes would be considered a production lift. Production lifts may be covered by one lift plan that outlines the parameters and the equipment to be utilized as well as the procedures.

The production lift plan is an extension of the routine lift plan and should:

- Complete "Safe Lift Plan" (Exhibit B) to assure safety procedure are addressed;
- Discuss operational factors such as lifting and swing speeds, and the travel path;
- Address hazards from failure of the rigging and/or collision in your JSA or STA;
- Understand the hazards associated with lifting over personnel and congested areas should be eliminated by either controlling access to the area or by changing the path of the lifting operation;
- Discuss specific restrictions over and above those for the routine lift plan that may be necessary because of weather limitations, time of day and/or temperature restrictions;
- Require that a designated leader (person in charge) of the rigging crew be appointed to oversee the safe lifting operation.

## Engineered Lift Plan

A lift will require engineering (completion of a Lift Data Sheet) if any of the following conditions exists:

- The load exceeds 85% of the crane's load chart capacity when the operator knows and verifies the weight of the load or exceeding 75% of the crane's load chart capacity when the load weight is estimated.
- Two or more cranes are required to make the lift (tandem lifts).
- Long lead time for replacement of materials.
- Lifts in congested areas where structures, pipelines, power lines or other obstacles are located.
- Lifts that involve turning or flipping the load, which can result in "shock loading" or "side loading."
- Lifts in areas of poor soil or unknown ground conditions.
- Lifts that include potentially unstable pieces.
- There are other significant factors (weather, clearance of high voltage, lifting over occupied structures, etc.)

For all engineered lifts, one of the following forms must be completed: Lift Data Sheet - Exhibit H for single crane and/or Lift Data Sheet - Exhibit I for double cranes. The Project Crane Safety Team will be responsible to create these plans. A copy of the plan or procedure will be kept at the work site and followed. If a Lift Data Sheet (Exhibit H) is not available on a computer for the Project Crane Safety Team, the operator should complete Exhibit J – Engineered Lift – Word document. This document must be reviewed and signed by the Operator and the Lifting Superintendent prior to making the lift. For assistance in completing these forms, contact the Project Manager and/or the site Safety Representative.

NOTE: Even though the actual load weight may be small compared to the base rating of the crane, it can still require an engineered lift plan. For example, a one-ton load on a fifty-ton capacity crane may seem insignificant. But if that crane's rated capacity at the actual load radius is only 2,400 lbs., the lift should be planned with a Lift Data Sheet.

NOTE: Weather conditions may create hazards that can cause a routine or production lift to become an engineered lift. The competent person must adjust the equipment and/or operations to address the effect of wind, ice, and snow on equipment stability and rated capacity. Wind effects must be considered prior to a lift, especially if the wind loads are significant. A secondary consideration is the surface area of the load being raised and the height to which the lift will take place. Winds at higher elevation usually travel faster. When wind velocity approaches the crane manufacturer's limitations, all work shall be stopped and the crane secured. Never guess at wind speed, if the wind is a factor. Have a wind measurement device for all engineered lifts.

Exhibit A



CRANE SELECTION & SETUP ANALYSIS

Contractor \_\_\_\_\_ Contact: \_\_\_\_\_  
 Project Name: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Project Location: \_\_\_\_\_ Job No.: \_\_\_\_\_  
 Date: \_\_\_\_\_ Duration: \_\_\_\_\_

**SET UP ANALYSIS:** The "controlling entity" must ensure safe crane access to and from the project; ensure the ground conditions are adequate to support the crane; and inform equipment users of hazardous conditions at project location.

**A. Access for cranes, trucks, and other erection Equipment:**

1. Haul road for cranes and trucks	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
2. Adequate entrance into and out of project	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
3. Use of public access requiring traffic control or permits	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
4. Adequate area for crane assembly	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
5. Adequate area for crane disassembly	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
6. Existing structures on site	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
7. Truck staging area available	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
8. Access outside of structure	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>

**B. Ground Conditions**

1. Level	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
2. Compaction to support crane loads	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
3. Ramps - - gradability	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
4. Crane restrictions (excavations & underground structures)	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
5. Slab thickness will support crane	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>

**C. Utilities**

1. Overhead electrical wire	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
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Can 20 feet of clearance be maintained? Yes  No  If No – Options below must be followed.

Option 1 - De-energize and ground. Visibly ground a worksite.

Option 2 - Assure no part of equipment, load line or load can get closer than 20 by implementing safety measures.

Option 3 – Determine line voltage and minimum approach distance, if closer must follow OSHA requirements.

2. Underground vaults, sewer, gas, fiber optics, electrical, etc.	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
3. Airport/Hospital helipad clearance	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
4. Airport/Hospital helipad flag or light	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>

**D. Other site condition not addressed above: -**

_____	OK	<input type="radio"/>	Needs attention	<input type="radio"/>	N/A	<input type="radio"/>
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**CRANE SELECTION:** Once site conditions have been analyzed, crane specific data is required to provide correct crane for the project.

1. Type of work:	Routine lifts <input type="radio"/>	Production lifts <input type="radio"/>	Engineered lifts (over 85 % if weight known, 75% if estimate) <input type="radio"/>
2. Crane Type:	Telescoping Boom <input type="radio"/>	Lattice Boom <input type="radio"/>	Rough Terrain <input type="radio"/>
	Truck mounted <input type="radio"/>	Crawler Mounted <input type="radio"/>	Other: _____
3. Maximum pick weight on project: _____	4. Maximum pick radius on project: _____	5. Maximum lift elevation: _____	

**EQUIPMENT SUPPLIER has made the determination to provide your project with the following crane:**

6. Selected Crane: _____	7. Boom length: _____	8. Jib length: _____	9. Offset: _____	10. Luffing Jib Length: _____
11. Counter weight configuration: _____	12. Block/Ball Main boom: _____	13. Number of parts of line:		
Series 1 _____ Series 2 _____ Series 3 _____	Auxiliary boom: _____	Main line: _____	Auxiliary line: _____	

Requestor of Crane: \_\_\_\_\_  
 Print \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Equipment Supplier: \_\_\_\_\_  
 Print \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_



# Exhibit B



## Safe Lift Plan

<b>1. PROJECT NAME &amp; NUMBER:</b>	<b>2. LIFT DATE:</b>
<b>3. LOAD DESCRIPTION:</b>	<b>4. MAKE &amp; MODEL OF CRANE(S):</b>
<b>5. ROUTINE LIFT:</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Unloading miscellaneous materials with capacity less than 75% of crane chart.	
<b>6. PRODUCTION LIFT:</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Repetitive lifts of similar size and shaped materials that are less than 75% crane chart.	
<b>7. ENGINEERED LIFT:</b> Yes <input type="checkbox"/> No <input type="checkbox"/> Any lift that exceeds 85% of the crane's load chart capacity when the operator knows and verifies the weight of the load or exceeding 75% of the crane's load chart capacity when the load is estimated, multi crane lifts or any lift with additional safety concerns. A "Lift Data Sheet" must be completed for all Engineered lifts. (See Exhibit H, I & J in Crane Operations Policy)	
<b>PRE-LIFT VERIFICATIONS: To be completed each day prior to making a lift - use the data for largest expected item to be lifted that day at the longest lifting radius to be used – This is Required</b>	
A. DID THE CREW REVIEW THE APPROVED RIGGING PLAN TO SET UP THIS LIFT? <input type="checkbox"/> Yes <input type="checkbox"/> No	
B. Operator(s) and Signal Person: <input type="checkbox"/> Operator(s) Name: _____ <input type="checkbox"/> Signalperson Name: _____ <input type="checkbox"/> Operator(s) Certified by: _____ <input type="checkbox"/> Signalperson Qualification: _____	
C. Safety measures and communications assurance: <input type="checkbox"/> JSA or STA completed and reviewed to identify hazards. <input type="checkbox"/> Third Party Annual Inspection completed. <input type="checkbox"/> Crane(s) Daily Inspection Report completed by competent person <input type="checkbox"/> Personal safety barricades up <input type="checkbox"/> Crane's or alternate air horn available <input type="checkbox"/> Path of suspended load controlled and communicated <input type="checkbox"/> Swing radius barricades installed <input type="checkbox"/> Lift, Travel & Swing Area clear <input type="checkbox"/> Means of communication established (signal person, oiler & crew)	
D. Final Check of machinery: <input type="checkbox"/> Crane(s) set-up on even terrain and level <input type="checkbox"/> Crane(s) set-up on mats if required (verify size & quantity) <input type="checkbox"/> Radius from crane(s) Center of Rotation to Payload checked <input type="checkbox"/> Crane(s) outrigger pads of sufficient size to handle ground pressure or floor loading <input type="checkbox"/> Boom length & number of line parts in block is correct <input type="checkbox"/> Safe working distance from power lines verified <input type="checkbox"/> Underground utilities verified & protection installed as require <input type="checkbox"/> Wind and weather conditions have been considered and adjustments made accordingly	
E. Lift Superintendent and Operator – Do you know? The total weight of the load below the boom tip? Yes <input type="checkbox"/> No <input type="checkbox"/> The load line size and capacity? Yes <input type="checkbox"/> No <input type="checkbox"/> The maximum working radius? Yes <input type="checkbox"/> No <input type="checkbox"/> The block/ball size and capacity? Yes <input type="checkbox"/> No <input type="checkbox"/> Chart capacity in current configuration? Yes <input type="checkbox"/> No <input type="checkbox"/> The rigging capacity? Yes <input type="checkbox"/> No <input type="checkbox"/> Percentage of total chart capacity? Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>If you answered "NO" do not make the lift? If you exceed 85% of chart capacity knowing the weight or 75% for estimated weights, multi-crane lifts or have any additional safety considerations - complete a "Lift Data Sheet."</b>	
F. When the Lift Data Sheet has been completed, is the planned lift in excess of 100% of the crane chart capacity? <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If you answered "Yes" do not make the lift and contact your project manager assistance.</b>	
G. A brief and final description of the planned sequence of the lifting operation was discussed with ALL individuals involved in the lift? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, explain why, or if yes and there were any comments from the discussion that should be noted : _____	
Lifting Superintendent and Crane Operator must review and evaluate lifting procedures daily. To the best of my knowledge the above checked off items have been evaluated and potential hazards eliminated.	
Lifting Superintendent Signature: _____	Crane Operator Signature: _____

## **Ground Condition Assessment**

The equipment must not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met.

The controlling entity must:

1. Ensure that ground preparations necessary to meet the OSHA requirements are provided.
2. Inform the user of the equipment and the operator of the location of hazards beneath the equipment set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) that are in the possession of the controlling entity.
3. If the A/D director or the operator determines that ground conditions do not meet the requirements in paragraph (b) of this section, that person's employer must have a discussion with the controlling entity.

### Ground Stability

The crane will support the load only if the ground will support the loaded crane. The ground on which the crane sits shall be reasonably level, well compacted, and stable enough to support the weight of the crane and its load without collapse or subsidence.

### Outriggers

All outriggers shall be used if the “on outrigger” load chart is to apply. All beams shall be fully extended otherwise capacity is lost and the “on rubber” chart shall be used. The wheels shall clear the ground otherwise the crane has an inside tipping axis on its tires and the “on rubber” chart shall be utilized.

### Leveling

All load chart ratings are based on the machine being perfectly level in all directions. This applies to cranes on crawlers, tires, outriggers or when traveling with the load. One of the most severe effects of being out of level is that side loads develop in the boom causing mobile cranes to lose capacity rapidly as the degree of out of level increases. The target levels provided on most machines can be used for initial leveling but should not be relied on for precision and/or final leveling. Alternate methods include using the crane’s hoist line as a plumb bob or utilizing a carpenter’s level on the lower carrier to confirm the target level.

### Blocking

The ground bearing pressure generated by a crane on outriggers can be very high due to the fact that the area of the outrigger pad is relatively small. To assure sufficient support, all lifts shall be completed in a manner consistent with the crane manufacturer’s design, procedures and recommendations. Blocking or load spreaders shall be used regardless of whether the crane is set up on soils or concrete.

### Matting

When the ground will not support the crane and its intended load, mats can be used to build a surface for the crane to move on or operate from. This method is most commonly used to support crawler cranes. They are also used around excavations, backfilled areas, and underground obstructions. The mats should be made of hardwood or Douglas fir in the size of 8” x8” timbers. Note: Mats may not be the solution in every situation. In cases where soil conditions are poor enough to require mats, there may be the need to get input from a soil analysis.

## **Assembly/Dis-Assembly Requirements**

Assembly/disassembly must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons ("A/D director").

1. Upon arrival at the job site, the Assembly/disassembly director (crane qualified/competent person) shall report directly to the Boldt office trailer and then proceed to the location of the crane assembly area.
2. The A/D Director shall introduce himself or herself to any and all subcontractor and crane crew giving a brief explanation of the erection procedures and safety concerns.
3. The erecting crew must be given instructions to assure they understand their tasks, the hazards associated with their tasks, and hazardous location that they need to avoid i.e. out of operator's view and working under the boom.
4. The A/D director shall assure that a copy of the current "Annual" crane inspection form is in the crane book.
5. The A/D director shall review the crane controls and capabilities with the operator/oiler and inform them of necessary inspections and preventative maintenance requirements. All deficiencies shall be reported directly the Boldt Company Project Superintendent.
6. Where a deficiency requires repairs, replacement of equipment or additional testing which may result in down time and additional expenses, the crane owner shall be afforded the opportunity to determine the method of correction which is acceptable to The Boldt Company, the A/D director, and the subcontractor.
7. After the assembly of the crane is complete, the A/D director must complete a Post Assembly Crane Inspection Report (Exhibit E) to assure the configuration is in accordance with manufactures equipment criteria.

## **Power Line Safety**

Specific requirements are established with in 29 CFR 1926. 1400 Subpart CC for assembly/ disassembly operations as well as hazard assessments and precautions inside the work zone. Always be aware of overhead obstructions & power lines. If tasks require you to be less than 20 feet from a power line, maintain distances established in OSHA Table A on the next page.

*Identify the assembly area or work zone by either:*

1. Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or
2. Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius.

Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) as follows:

Option (1)—De-energize and ground. Confirm from the utility owner/operator that the power line has been de-energized and visibly grounded at the worksite.

Option (2) – Maintain 20 foot clearance. Ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.

Option (3) --Table A clearance

<b>Voltage (nominal, KV, alternating current)</b>	<b>Minimum clearance distance (feet)</b>
Up to 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1000	45
Over 1000	As established by the power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution

*Preventing encroachment/electrocution* where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements must be met:

1. Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.
2. If tag lines are used, they must be non-conductive.
3. Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line.

In addition, one of the following measures must be implemented:

1. Use a dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:
  - a. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
  - b. Be positioned to effectively gauge the clearance distance.
  - c. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
  - d. Give timely information to the operator so that the required clearance distance can be maintained.
2. Use a device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
3. Provide an insulating link/device installed at a point between the end of the load line (or below) and the load.
4. Install an elevated warning line, barricade or line of signs in view of operator.

*Voltage information* where Option (3) is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

Contact the Safety Department for further assistance.

To protect workers against electrocution when operating or working around cranes near overhead power lines, the following safe work practices shall be followed:

- Evaluate the job site before beginning work to decide the size and type of machinery to use and

the safest areas for machinery operation and material storage.

- Know the location and voltage of all overhead power lines at the job site.
- Before work begins, de-energize power lines if possible, erect insulated barriers to prevent physical contact with the energized lines, and establish safe clearance between the energized lines and boomed equipment.
- Post warnings on cranes cautioning operators to maintain safe clearances between energized power lines and their equipment.
- Mark safe routes where cranes can travel beneath power lines.
- Assume all power lines are energized and maintain OSHA crane clearances.
- Operate cranes at a slower-than-normal rate in power line areas.
- Use caution when moving over uneven ground that could cause the crane to weave or bob into power lines.
- Use caution near long spans of overhead power lines, since wind can cause the power lines to sway back and forth and reduce the clearance between the crane and the power line.
- Where it is difficult for the crane operator to see the power lines or see the clearance during crane movement, a signal person should be assigned to watch and give immediate warning when the crane comes close to the limits of safe clearance.
- All workers should stay well away from the crane when it is close to power lines.

If contact is made between a crane and an energized line, the crane operator should stay inside the cab and try to remove the crane from contact by moving it in the reverse direction from that which caused the contact. If the crane cannot be moved away from contact, the operator should stay inside the cab until the lines have been de-energized. Everyone else should keep away from the crane, ropes, and load, since the ground around the machine might be energized. Workers should have a quick way of calling for or getting help when an emergency occurs. All workers should be trained in cardiopulmonary resuscitation (CPR).

### **Work Area Control**

To prevent employees from entering these hazard areas: 1) Train each employee assigned to work on or near the equipment in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure. 2) Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas.

To protecting employees in the hazard area: 1) Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location. 2) Where the operator knows that an employee went to a location, the operator must not rotate the superstructure until the operator is informed in accordance with a pre-arranged system of communication that the employee is in a safe position (i.e. confirmed verbal communication).

### **Maintenance And Inspections**

Crane maintenance is vital to the project as well as the equipment itself. All inspection criteria and document shall be consistent with Federal Occupational Safety and Health Administration, Department of Labor and regulatory agency of the governing state where the project is located.

Annual inspection must be completed by a qualified person. Daily and monthly inspections, as well as the wire rope inspection, shall be completed by a competent person. Proof of such inspection shall be located on the crane. The inspection record shall be readily available for review by regulatory agencies or Boldt Company representatives.

A pre-shift or “**Daily Crane Inspection Report**” (see Exhibit C) is required. Each day, prior to use, this form shall be completed in its entirety. When completing this form, indicate the crane #, make of the crane, project number and location, and also sign the report legibly. Do not leave any sections blank. Distribute the sheets as indicated on the bottom of the form. Any deficiencies found in the pre- shift inspections shall be reported and the equipment taken out of service until repairs are completed. An equipment out-of-service tag shall be place in operator’s cab to prevent accidental operation

The second type of required inspection is the “**Monthly Crane Inspection Report**” (see Exhibit D). This shall be completed initially and once per month thereafter. An example when a monthly report should be completed is at the assembly when the crane arrives on site. After completion of the report, it shall not be necessary to complete a daily report for that same day. Simply note on the daily report that a monthly report was completed on that day. Distribute copies as indicated on the bottom of the report.

The “**Monthly Wire Rope Inspection Report**” is to be completed in conjunction with the Monthly Crane Inspection Report. This report includes wire rope, sheaves, and the drums on the crane. The information in the manual shall be read and understood, as it shows illustrations and tests for identifying problems. Distribute the sheets as indicated on the bottom of the form.

Wire rope shall be taken out of service if the following conditions exist:

1. Kinking, crushing, bird caging or wear of one-third of the original diameter of outside wires;
2. Any evidence of heat damage;
3. A reduction of the rope diameter for each size listed:
4. Running ropes having six randomly distributed broken wires in one strand in one lay;
5. In rotation-resistant ropes: two randomly distributed broke wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters.
6. In pendants or standing wire ropes: more than two broken wires in one rope lay located in rope beyond end connections and/or more than one broken wire in a rope lay located at an end connection.

Diameters	5/16	3/8-1/2	9/16-3/4	7/8-1 1/8	1 1/4-1 1/2
Reduction	1/64	1/32	3/64	1/16	3/32

The third type of required inspection is the “**Annual Crane Inspection Report**” (Current annual testing is being completed by All Test & Inspection, Inc.). The operating engineer of the equipment must verify that the annual report is present and has been completed within the past year. This annual inspection shall be furnished by an outside agency or a competent company representative.

Upon the completion of erection of a lattice boom crane the Assembly/Dis-assembly Director will complete a “**Post Assembly Crane Inspection Report**” (see Exhibit E) to assure that the configuration is in accordance with manufactures equipment criteria.

In addition to the inspection of mobile cranes, there is an additional required inspection “**Daily Overhead Crane inspection Report**” (see Exhibit F) for overhead and Gantry cranes. This report shall be completed on a daily basis when work requires frequent /extensive usage or if necessary for a specific job to be completed. While working at an owner’s/client’s facility and using their overhead/gantry cranes, hooks and hoist chains will be inspected and documented on this report. Again, distribute copies as indicated on the bottom of the report. Certification of the hooks and hoist chains is to be completed by the owner and a copy kept on file and made available upon request.

There are additional requirements for inspection tower cranes. The Boldt “**Tower Crane Daily Inspection Checklist**” (see Exhibit G) must be completed on a daily basis before any lifts take place.

Section 1926.1412 (Inspections) applies to tower cranes, except that the term "assembly" is replaced by "erection."

*Pre-erection inspection.* Before each crane component is erected, it must be inspected by a qualified person for damage or excessive wear. The qualified person must pay particular attention to components that will be difficult to inspect thoroughly during shift inspections. If the qualified person determines that a component is damaged or worn to the extent that it would create a safety hazard if used on the crane, that component must not be erected on the crane unless it is repaired and, upon re-inspection by the qualified person, found to no longer create a safety hazard.

If the qualified person determines that, though not presently a safety hazard, the component needs to be monitored, the employer must ensure that the component is checked in the monthly inspections. Any such determination must be documented. The documentation must be available to any individual who conducts a monthly inspection.

*Post-erection inspection.* In addition to the requirements in § 1926.1412(c), the following requirements must be met:

- A load test using certified weights, or scaled weights using a certified scale with a current certificate of calibration, must be conducted after each erection.
- The load test must be conducted in accordance with the manufacturer's instructions when available. Where these instructions are unavailable, the test must be conducted in accordance with written load test procedures developed by a registered professional engineer familiar with the type of equipment involved.

Rated load testing is part of the maintenance and servicing for all cranes. These tests shall be documented on the maintenance reports. These are filled out weekly or after servicing to confirm adequacy of repairs and differ from the following inspection reports.

All cranes that have been shut down and/or taken out of service for a designated amount of time must have a complete inspection prior to use which would include the wire ropes. Documentation of the inspection must comply with the requirements listed in the Maintenance Program.

All windows in the cab shall be of safety glass, or equivalent, and not have any defects or distortion which could prevent safe operation of the machine. Windows damaged shall be repaired/replaced at the job site. See Exhibits C, D, E, F and G on following pages for specific inspection guidelines.



# Exhibit C

<b>BOLDT</b>		<b>Daily Crane Inspection Report/Daily Safe Lift Plan</b>							
Project Name: _____				Crane Make & Number: _____					
Project Number: _____				Week Ending: _____					
<p>A competent person must begin a visual inspection prior to each shift the equipment will be used, which must be completed before or during that shift. The inspection must consist of observation for apparent deficiencies. All defective items shall be recorded below in the "Comments" section and reported to the on-site Project Manager/Superintendent immediately. Distribute as indicated below at the end of each week, or end of crane use for the week.</p>									
<p>VISUAL INSPECTION CODES: <u>G</u> – Good/New Condition    <u>R</u> – Needs Immediate Repair    <u>M</u> – Missing (needs replacement)    <u>N/A</u> – Not Applicable</p>									
Daily Crane Inspection	Day / Date	Mon /	Tues /	Wed /	Thurs /	Fri /	Sat /	Sun /	Comments <i>(Indicate date of repairs/corrections)</i>
	1 Owner's manual, load chart, hand signal chart								
	2 Fire extinguisher, cab windows								
	3 Wire rope reeving, hoist drum wrapping								
	4 Load line and whip line condition								
	5 Load block & ball, hooks and latches								
	6 Boom - lacing/cords, jib pendant lines								
	7 Outriggers, tires, tracks								
	8 Air, hydraulics, electrical, control systems								
	<b>*Mandatory for crane operation*</b>								
	9 Crane leveling device, Operational horn								
	10 Boom and jib stops, Locking foot pedal brake								
	<b>*7 days to repair*</b>								
	11 Anti-two blocking device								
	12 Boom and/or Luffing jib limiting device								
<b>*30 days to repair*</b>									
13 Boom angle/length & radius/jib angle indicators									
14 Operational load weighing device <i>(if manufactured after 2003)</i>									
<p><b>PRE-LIFT VERIFICATIONS:</b> To be completed each day. Use the data for the heaviest item to be lifted that day at the longest lifting radius to be used.</p>									
15 Total weight of the load plus all deductions									
16 Maximum working radius									
17 Max chart capacity in working configuration									
18 Percent of total chart capacity									
19 Load line, block/ball, rigging within capacity (Yes/No)									
20 Engineered Lift (Yes/No)									
<p><b>ENGINEERED LIFT:</b> Any lift that exceeds 85% of the crane's load chart capacity when the operator knows and verifies the weight of the load, or exceeding 75% of the crane's load chart capacity when the load is estimated, multi-crane lifts or any lift with additional safety concerns. A "Lift Data Sheet" must be completed for all Engineered Lifts. (See Exhibit H, I &amp; J in Crane Operations Policy)</p>									
<p><b>LOAD DESCRIPTION:</b> _____</p>									
<p><b>SAFETY MEASURES &amp; COMMUNICATIONS ASSURANCE: ALL ITEMS SHALL BE VERIFIED &amp; CHECKED BEFORE LIFTING PROCEDURES BEGIN.</b></p>									
<input type="checkbox"/> Lift/rigging plan communicate to crew	<input type="checkbox"/> Annual Inspection Current	<input type="checkbox"/> Crane(s) Daily Inspection Report completed							
<input type="checkbox"/> Ground pressure, mats, pads sufficient	<input type="checkbox"/> Underground/overhead hazards identified	<input type="checkbox"/> Weather conditions allow safe operation							
<input type="checkbox"/> Swing radius barricaded	<input type="checkbox"/> Lift, travel path & swing area clear	<input type="checkbox"/> Means of communication established							
<p>Signature of Operator / Signature of Qualified Rigger. By signing below, you are verifying that the above information is accurate and complete.</p>									
OPERATOR	RIGGER	OPERATOR	RIGGER						
Mon. _____	_____	Fri. _____	_____						
Tues. _____	_____	Sat. _____	_____						
Wed. _____	_____	Sun. _____	_____						
Thur. _____	_____		_____						

Original - Maintenance Department (Appleton); Yellow Copy - Maintain in Crane for a minimum of 90 days

Form 5-11 (Revision Date: 2/15 FR)



**Exhibit D**



**Monthly Crane Inspection Report**

Inspection Date: \_\_\_\_\_

Boldt No. \_\_\_\_\_ Crane: \_\_\_\_\_ Engine Hours: \_\_\_\_\_  
 Project No. & Location \_\_\_\_\_

- INSTRUCTIONS:**
- 1) This report is to be completed at the end of each month. Operator shall use codes for each item listed below. All defective items shall be recorded below (comments) and reported to the on-site project manager/superintendent immediately.
  - 2) After completing the form, maintain one copy in the folder on the crane and return one copy to the Safety Department, Appleton, WI.

**CODES:** G = New or Good Condition; N/A = Not Applicable; R = Needs immediate repair; M = Missing (needs replacement)

**1. GENERAL**

- ( ) Appearance
- ( ) Paint
- ( ) Cab (including housekeeping)
- ( ) Glass
- ( ) Grease/oil leaks
- ( ) Excessively worn or damaged tires

**2. ENGINE**

- ( ) Oil level and condition
- ( ) Hour meter
- ( ) Operating condition
- ( ) Cooling system
- ( ) Battery condition
- ( ) Air system
- ( ) Pressure
- ( ) Engine instruments
- ( ) All guards and chain covers in position

**3. DRAW WORK (cable crane)**

- ( ) Clutch
- ( ) Brake
- ( ) Pawl
- ( ) Swing shaft
- ( ) Clutches
- ( ) Brake
- ( ) Drum shaft
- ( ) Flanges - left hand
- ( ) Flanges - right hand
- ( ) Clutches - left hand
- ( ) Clutches - right hand
- ( ) Third drum
- ( ) Clutch
- ( ) Brake
- ( ) Control operation

**4. UPPER WORKS (hydraulic crane)**

- ( ) Boom hoist cylinders
- ( ) Boom hoist cylinder mounting
- ( ) Swing motor
- ( ) Swing gear assembly
- ( ) Swing brake
- ( ) Main hoist flanges
- ( ) Auxiliary hoist flanges
- ( ) Main hoist brakes
- ( ) Auxiliary hoist brakes
- ( ) Control operation

**5. HYDRAULIC SYSTEM**

- ( ) Hoses
- ( ) Lines
- ( ) Pumps
- ( ) Motors
- ( ) Fittings
- ( ) Hydraulic fluid level
- ( ) Leakage

**6. TRACKS**

- ( ) Chains
- ( ) Sprockets
- ( ) Idlers
- ( ) Pins
- ( ) Track adjustment
- ( ) Roller path
- ( ) Travel brake

**7. CARRIER**

- ( ) Tire condition
- ( ) Brakes
- ( ) Steering
- ( ) Outriggers
- ( ) Glass
- ( ) Controls
- ( ) Fire extinguisher (ABC minimum)

**8. BOOM (cable crane)**

- ( ) Cords (length of damaged section - \_\_\_\_\_)
- ( ) Lacing (length of damaged section - \_\_\_\_\_)
- ( ) Boom stops
- ( ) Automatic boom stops
- ( ) Automatic mast stop
- ( ) Gantry sheaves lubricated (sheave condition - \_\_\_\_\_)
- ( ) Load block (capacity - \_\_\_\_\_)
- ( ) Load block condition
- ( ) Hook condition (bent, cracked, etc.)
- ( ) Hook safety latch
- ( ) Jib condition (length - \_\_\_\_\_)
- ( ) Jib sheave axle lubricated
- ( ) Anti-two-blocking device

*(continued on page 2)*





## Monthly Wire Rope Inspection Report

- INSTRUCTIONS:**
- 1) This sheet is to be used for monthly mandatory inspections.
  - 2) Operator shall use codes for each item listed below. All defective items shall be recorded below and reported to the on-site Project Manager/Superintendent immediately.
  - 3) Forward original copy of this completed form to the Appleton Heavy Equipment Maintenance Department (per copy distribution instructions below).
  - 4) The preceding pages are to be used as reference to judge wire rope condition.

**CODES:**  
 G=good/new condition  
 R=needs immediate repair  
 N/A=not applicable

	Indicate measured diameter with caliper	Broken Wires		Excessive Wear	End Attachments		Rope Damage	Sheave Condition	Drum Condition	Rope Lay Measurement
		In 1 Rope Lay	In 1 Strand of 1 Rope Lay		Broken Wires	Fitting Condition				
<b>Applicable Standards of Removal of Maintenance</b>	LOSS OF: 3/64 in. for up to 1/4 in. wire rope; 1/16 in. for 7/8—1-1/8 in wire rope; 3/32 in for 1-1/4—1-1/2 in wire rope	6 or more	3 or more	1/3 diameter of outside wire worn	1 or more	Corroded, cracked, bent, worn or improperly applied	Stretched, flattened, crushed, bulged, kinked, pitted, corroded, etc.	Surface defects, oversized groove tolerance, jagged edges, out of alignment	Scuffed, etc.	Elongation in excess of 6 in./100 ft. in a 6 strand rope or 9 in./100 ft. in an 8 strand rope
Location of Rope	Main Hoist									
	Whip Line									
	3 <sup>rd</sup> Drum									
	Boom Hoist									
	Pendants									

Signature of Operator inspecting crane: \_\_\_\_\_

Date: \_\_\_\_\_

**COPY DISTRIBUTION:** Original—Appleton Office Heavy Equipment Maintenance Department; Yellow—Maintain in crane

FORM NO.S-3 (REV. 4-96)



**Post Assembly Crane  
Inspection Report**

Inspection Date: \_\_\_\_\_

Boldt No. \_\_\_\_\_ Crane: \_\_\_\_\_ Engine Hours: \_\_\_\_\_  
Project No. & Location \_\_\_\_\_

- INSTRUCTIONS:**
- 1) This report is to be completed at the end of the crane assembly process. The A/D director shall use codes for each item listed below. All defective items shall be recorded below (comments) and reported to the on-site project manager/superintendent immediately.
  - 2) After completing the form, maintain one copy in the folder on the crane and return one copy to the Safety Department, Appleton, WI.

**CODES:** G = New or Good Condition; N/A = Not Applicable; R = Needs immediate repair; M = Missing (needs replacement)

- |  |   |
|--|---|
| <p><b>1. GENERAL</b></p> <ul style="list-style-type: none"> <li>( ) Appearance</li> <li>( ) Paint</li> <li>( ) Cab (including housekeeping)</li> <li>( ) Glass</li> <li>( ) Grease/oil leaks</li> <li>( ) Excessively worn or damaged tires</li> </ul> <p><b>2. ENGINE</b></p> <ul style="list-style-type: none"> <li>( ) Oil level and condition</li> <li>( ) Hour meter</li> <li>( ) Operating condition</li> <li>( ) Cooling system</li> <li>( ) Battery condition</li> <li>( ) Air system</li> <li>( ) Pressure</li> <li>( ) Engine instruments</li> <li>( ) All guards and chain covers in position</li> </ul> <p><b>3. DRAW WORK (cable crane)</b></p> <ul style="list-style-type: none"> <li>( ) Clutch</li> <li>( ) Brake</li> <li>( ) Pawl</li> <li>( ) Swing shaft</li> <li>( ) Clutches</li> <li>( ) Brake</li> <li>( ) Drum shaft</li> <li>( ) Flanges – left hand</li> <li>( ) Flanges – right hand</li> <li>( ) Clutches – left hand</li> <li>( ) Clutches – right hand</li> <li>( ) Third drum</li> <li>( ) Clutch</li> <li>( ) Brake</li> <li>( ) Control operation</li> </ul> <p><b>4. UPPER WORKS (hydraulic crane)</b></p> <ul style="list-style-type: none"> <li>( ) Boom hoist cylinders</li> <li>( ) Boom hoist cylinder mounting</li> <li>( ) Swing motor</li> <li>( ) Swing gear assembly</li> <li>( ) Swing brake</li> <li>( ) Main hoist flanges</li> <li>( ) Auxiliary hoist flanges</li> <li>( ) Main hoist brakes</li> <li>( ) Auxiliary hoist brakes</li> <li>( ) Control operation</li> </ul> | <p><b>5. HYDRAULIC SYSTEM</b></p> <ul style="list-style-type: none"> <li>( ) Hoses</li> <li>( ) Lines</li> <li>( ) Pumps</li> <li>( ) Motors</li> <li>( ) Fittings</li> <li>( ) Hydraulic fluid level</li> <li>( ) Leakage</li> </ul> <p><b>6. TRACKS</b></p> <ul style="list-style-type: none"> <li>( ) Chains</li> <li>( ) Sprockets</li> <li>( ) Idlers</li> <li>( ) Pins</li> <li>( ) Track adjustment</li> <li>( ) Roller path</li> <li>( ) Travel brake</li> </ul> <p><b>7. CARRIER</b></p> <ul style="list-style-type: none"> <li>( ) Tire condition</li> <li>( ) Brakes</li> <li>( ) Steering</li> <li>( ) Outriggers</li> <li>( ) Glass</li> <li>( ) Controls</li> <li>( ) Fire extinguisher (ABC minimum)</li> </ul> <p><b>8. BOOM (cable crane)</b></p> <ul style="list-style-type: none"> <li>( ) Cords (length of damaged section - _____)</li> <li>( ) Lacing (length of damaged section - _____)</li> <li>( ) Boom stops</li> <li>( ) Automatic boom stops</li> <li>( ) Automatic mast stop</li> <li>( ) Gantry sheaves lubricated (sheave condition - _____)</li> <li>( ) Load block (capacity - _____)</li> <li>( ) Load block condition</li> <li>( ) Hook condition (bent, cracked, etc.)</li> <li>( ) Hook safety latch</li> <li>( ) Jib condition (length - _____)</li> <li>( ) Jib sheave axle lubricated</li> <li>( ) Anti-two-blocking device</li> </ul> |
|--|---|

(continued on page 2)



# Exhibit F



## Daily Overhead Crane Inspection Report

Week Ending: \_\_\_\_\_

Operator Name: \_\_\_\_\_  
(Please Print)

Crane #: \_\_\_\_\_ Make: \_\_\_\_\_

Project # / Location: \_\_\_\_\_

- INSTRUCTIONS:**
- 1) Operator shall use codes for each item listed below. All defective items shall be recorded below (*Comments*) and reported to the on-site Project Manager/Superintendent immediately.
  - 2) At the end of each week or end of crane use for the week, maintain one copy in the crane and forward a copy to the Safety Department.

**CODES:** G = New or Good Condition; N/A = Not Applicable; R = Needs Immediate Repair; M = Missing (needs replacement)

Daily Visual Checks		Date							Comments <i>(Indicate date of repairs/corrections)</i>
		Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	
1.	Bottom Blocks								
2.	Crane Hooks								
3.	Pendant								
4.	Button Control								
5.	Pendant Cable								
6.	Bridge Brake								
7.	Trolley Brake								
8.	Hoist Brakes								
9.	Trolley Travel								
10.	Bridge Travel								
11.	Upper Limits								
12.	Lower Limits								
13.	Crane Rails								
14.	Upper Block								
15.	Cable								
16.	Hoist Drum								
17.	Trolley Condition								
18.	Bridge Stops								
19.	Trolley Stops								
20.	Overall Condition								

Signature of operator inspecting crane:

Sun. \_\_\_\_\_  
 Mon. \_\_\_\_\_  
 Tues. \_\_\_\_\_  
 Wed. \_\_\_\_\_

Thurs. \_\_\_\_\_  
 Fri. \_\_\_\_\_  
 Sat. \_\_\_\_\_

COPY DISTRIBUTION : Original—Safety Department ; Yellow—Maintain in Jobsite File

FORM NO. S-27 (REV. 12/04)





## Tower Crane Daily Inspection Checklist

Week Ending: \_\_\_\_\_

Crane No. & Make \_\_\_\_\_ Project No. & Location \_\_\_\_\_

1. Operator shall use codes for each item listed below. All defective items shall be recorded below (Comments) and reported to the on-site Project Manager/Superintendent immediately.
2. At the end of each week or end of crane use for the week, distribute as indicated below.

CODES: G - Good/New Condition    N/A - Not Applicable    R - Needs Immediate Repair    M - Missing (needs replacement)

Daily Visual Checks		Date	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Comments <i>(Indicate date of repairs/corrections)</i>
<b>PRELIMINARY</b>	Foundation bolts/anchors									
	Main power disconnect switch									
	Hook sheaves/swivel									
	Power contact grounding									
	Support guys/anchors									
<b>TOWER</b>	Ladders/platforms									
	Section connecting bolts/pins									
	Safety rails/chains									
	Tie-in assembly(s)									
	Chord and lacing welds									
	Power cable									
	Hydraulic hoses for leaks									
	Gear boxes for oil level/leaks									
	Slewing ring bolts									
	Counterweights secure									
	Motor/winch hold-down bolts									
	Wire rope condition									
	Hoist drum spooling									
<b>CRANE OPERATION</b>	Control function									
	Swing break									
	Moment overloads									
	Hoist overloads									
	Trolley cable/brake									
	Sheaves									
	Gear limits									
	Trolley limits									
	Luffing limits									
	Hoist limits									
Proximity to power lines										
<b>CAB</b>	Fire extinguisher									
	Load chart									
	Window glass									
	Operations manual									

Signature of operator inspecting crane: \_\_\_\_\_

Sun. \_\_\_\_\_  
 Mon. \_\_\_\_\_  
 Tues. \_\_\_\_\_  
 Wed. \_\_\_\_\_

Thur. \_\_\_\_\_  
 Fri. \_\_\_\_\_  
 Sat. \_\_\_\_\_

(Rev. 5/28/08)

## Crane Safety Requirements

1. Report any unsafe conditions to the subcontractor foreman or Project Superintendent immediately.
2. Access for entry and assembly of the crane shall be free from obstructions, underground hazards, and overhead power lines.
3. All crane equipment and operation of crane equipment shall meet the requirements of the manufacturer, ANSI, ASME, and OSHA.
4. Crane equipment shall have the required inspection and proof load testing certificates current and available upon arrival at the job site.
5. Lifting beams (commonly known as “spreader bars”) shall conform to ASME B30.20, 2010 regulations which requires the following permanent markings:
  - 5.1. Manufacturer’s name
  - 5.2. Serial number (ID #)
  - 5.3. Weight of the bar if over 100 lbs.
  - 5.4. Rated load
  - 5.5. Initial Proof load testing at 125% of the lifting beam’s capacity.
6. Proof of initial load testing shall be provided for all lifting beams. Load test shall not exceed 125% of the rated load.
7. Engineering data shall be provided to The Boldt Company management on all specialized below-the-hook lifting devices.
8. No crane shall be operated near high voltage as follows:
  - 0 to 50 kV 10 feet
  - over 50 to 200 kV 15 feet
  - over 200 to 350 kV 20 feet
  - over 350 to 500 kV 25 feet
  - over 500 to 750 kV 35 feet
  - over 750 to 1000 kV 45 feet
9. No crane shall travel with the boom or mast lowered near high voltage as follows:
  - Up to 0.75 kV 4 feet
  - 0.75 to 50 kV 6 feet
  - over 50 to 345 kV 10 feet
  - over 345 to 750 kV 16 feet
  - over 750 to 1000 kV 20 feet
10. No loads shall be lifted over personnel.
11. No one shall place their hands or any other portion of the body under a load suspended by the crane.
12. No unauthorized personnel shall be working within the lifting area of the crane.
13. Yellow caution tape or similar devices shall be used to prevent personnel from entering the crane rotation area.
14. All personnel shall be clear of crawler tracks while the crane is moving.
15. All personnel except for the operator and oiler shall be clear of the crane rotating area during its operation.
16. A designated/qualified/competent signal person shall provide direction to the operator using the standard hand signals or radio communications that are common to the industry. If the means of communication is interrupted the crane operator must safely stop operations until communication is restored. Radios should be tested prior to lifting operations to assure a proper means of communication is established.
17. Operation of crane equipment by persons designated as the oiler shall be conducted under the direct supervision of an experienced operator during all lifts. Where such lifts are conducted, notice shall be given to all employees working with the crane equipment. (*Direct supervision requires the experienced operator to be present at the operator’s station during all lifts.*)



18. No lifts shall exceed 85% of the crane manufacturer's load chart capacity unless a written engineered lift plan (Lift Data Sheet) has been completed and approved.
19. The manufacturer's load chart shall be affixed to the crane or located in the operator's cab accessible to the operator.
20. All lifts and crane configurations shall be consistent with the manufacturer's requirements and load charts.
21. When pick and carry operations occur, the ground shall be smooth, level, and compacted, free from obstructions, underground hazards, and overhead power lines. (Check specific manufacturer's requirement for pick and carry.)
22. No cribbing shall be placed under the crane axle, frame, or out rigger extension beams.
23. Jib and boom shall be free from structural damage that exceeds the manufacturer's maximum allowable tolerances.
24. Anti-two-blocking device shall be functional and operational on all cranes equipped with such device.
25. No crane shall be operated in wind speeds that exceed crane manufacturer's recommendations. (Where surface area of material being lifted creates a sail affect, the crane may be required to cease operating at lower wind speeds than stated.)
26. No person shall disable or circumvent a safety device while the crane is performing lifting service.









# Exhibit J – Engineered Lift



Project Name: \_\_\_\_\_ Job #: \_\_\_\_\_

Description of Object to be Lifted: \_\_\_\_\_

Location of Lift: \_\_\_\_\_ Date of Lift: \_\_\_\_\_

## ENGINEERED LIFT PLAN

A LIFT PLAN SHOULD BE COMPLETED PRIOR TO MOBILIZATION OF EQUIPMENT AND RIGGING

<p><b>A. WEIGHT</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">1. Equipment Condition:</td> <td style="width: 20%;">New ( )</td> <td style="width: 20%;">Used (x)</td> <td style="width: 30%;"></td> </tr> <tr> <td>2. Weight Empty:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>3. Weight of Headache Ball:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>4. Weight of Block:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>5. Weight of Lifting Bar:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>6. Weight of Slings &amp; Shackles:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>7. Weight of Jib (Erected/Stored):</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>8. Weight of Headache Ball on Jib:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>9. Weight of Cable (Load Fall):</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>10. Allowance for Unaccounted Material in Equipment:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td>11. Other:</td> <td>_____</td> <td>lbs.</td> <td></td> </tr> <tr> <td><b>Total Weight:</b></td> <td colspan="2" style="border: 1px solid black; text-align: center;">_____</td> <td></td> </tr> <tr> <td>Source of Load Weight:</td> <td colspan="3">_____</td> </tr> <tr> <td>(Name Plate, Drawings, Calculated, etc)</td> <td colspan="3">_____</td> </tr> <tr> <td>Weights Verified By:</td> <td colspan="3">_____</td> </tr> </table> <p><b>B. JIB</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Erected?</td> <td style="width: 20%;">Stored?</td> <td style="width: 20%;">_____</td> <td style="width: 30%;">(if yes then)</td> </tr> <tr> <td>1. Is Jib to be Used?</td> <td></td> <td>_____</td> <td></td> </tr> <tr> <td>2. Length of Jib:</td> <td></td> <td>_____</td> <td></td> </tr> <tr> <td>3. Angle of Jib:</td> <td></td> <td>_____</td> <td></td> </tr> <tr> <td>4. Rated Capacity of Jib (From Chart):</td> <td></td> <td colspan="2" style="border: 1px solid black; text-align: center;">_____</td> </tr> </table> <p><b>C. CRANE PLACEMENT</b>      If not applicable -N/A ( )</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">1. Subgrade Material Existing &amp; New Subgrade Bearing Capacity?</td> <td style="width: 70%;">_____</td> </tr> <tr> <td>2. Track Ground Bearing Pressure?</td> <td>_____</td> </tr> <tr> <td>3. Timber Mat Distributed Ground Bearing Pressure?</td> <td>_____</td> </tr> <tr> <td>4. Other Hazards (Overhead Power Lines, Underground Utilities, etc)?</td> <td>_____</td> </tr> </table> <p><b>D. CABLE</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">1. Number of Parts of Cable:</td> <td style="width: 70%;">_____</td> </tr> <tr> <td>2. Size of Cable &amp; Rated Line Pull:</td> <td>_____</td> </tr> <tr> <td>3. Size of Block (Load Rating):</td> <td>_____</td> </tr> </table>	1. Equipment Condition:	New ( )	Used (x)		2. Weight Empty:	_____	lbs.		3. Weight of Headache Ball:	_____	lbs.		4. Weight of Block:	_____	lbs.		5. Weight of Lifting Bar:	_____	lbs.		6. Weight of Slings & Shackles:	_____	lbs.		7. Weight of Jib (Erected/Stored):	_____	lbs.		8. Weight of Headache Ball on Jib:	_____	lbs.		9. Weight of Cable (Load Fall):	_____	lbs.		10. Allowance for Unaccounted Material in Equipment:	_____	lbs.		11. Other:	_____	lbs.		<b>Total Weight:</b>	_____			Source of Load Weight:	_____			(Name Plate, Drawings, Calculated, etc)	_____			Weights Verified By:	_____			Erected?	Stored?	_____	(if yes then)	1. Is Jib to be Used?		_____		2. Length of Jib:		_____		3. Angle of Jib:		_____		4. Rated Capacity of Jib (From Chart):		_____		1. Subgrade Material Existing & New Subgrade Bearing Capacity?	_____	2. Track Ground Bearing Pressure?	_____	3. Timber Mat Distributed Ground Bearing Pressure?	_____	4. Other Hazards (Overhead Power Lines, Underground Utilities, etc)?	_____	1. Number of Parts of Cable:	_____	2. Size of Cable & Rated Line Pull:	_____	3. Size of Block (Load Rating):	_____	<p><b>E. SIZING OF SLINGS</b></p> <p>1. <u>Slings Selection</u></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 80%;">a. Type of Arrangement (Straight, Basket, Choke, etc.):</td> <td style="width: 20%;">_____</td> </tr> <tr> <td>b. Number of Slings in Hook-up:</td> <td>_____</td> </tr> <tr> <td>c. Slings Size:</td> <td>_____</td> </tr> <tr> <td>d. Slings Length:</td> <td>_____</td> </tr> <tr> <td>e. Rated Capacity of Slings:</td> <td style="border: 1px solid black; text-align: center;">_____</td> </tr> </table> <p>2. <u>Shackle Selection</u></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 80%;">a. Pin Diameter (inches):</td> <td style="width: 20%;">_____</td> </tr> <tr> <td>b. Capacity (tons):</td> <td>_____</td> </tr> <tr> <td>c. Shackle Attached to Load By:</td> <td>_____</td> </tr> <tr> <td>d. Number of Shackles:</td> <td>_____</td> </tr> </table> <p><b>F. CRANE</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">1. Type of Crane:</td> <td style="width: 70%;">_____</td> </tr> <tr> <td>2. Crane Capacity:</td> <td>_____</td> </tr> <tr> <td>3. <u>Lifting Arrangement</u></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">a. Max Distance—Center of Load to Center of Crane Pin:</td> <td>_____ ft.</td> </tr> <tr> <td style="padding-left: 20px;">b. Length of Boom:</td> <td>_____ ft.</td> </tr> <tr> <td style="padding-left: 20px;">c. Angle of Boom at Pick-up:</td> <td>_____ degrees</td> </tr> <tr> <td style="padding-left: 20px;">d. Angle of Boom at Set:</td> <td>_____ degrees</td> </tr> <tr> <td style="padding-left: 20px;">e. <u>Rated Capacity of Crane Under Severest Lifting Conditions</u> (from chart)</td> <td></td> </tr> <tr> <td style="padding-left: 40px;">1. Over Rear:</td> <td>_____ lbs.</td> </tr> <tr> <td style="padding-left: 40px;">2. 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1. Equipment Condition:	New ( )	Used (x)																																																																																																																																																																																					
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(Name Plate, Drawings, Calculated, etc)	_____																																																																																																																																																																																						
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NOTE ON BACK ANY SPECIAL INSTRUCTIONS OR RESTRICTIONS FOR CRANE, RIGGING, LIFT, ETC.

\*MULTIPLE CRANE LIFTS REQUIRE COMPLETION OF THE LIFT DATA SHEET (EXHIBIT I) FOR DOUBLE CRANE LIFT.  
 \*ANY CHANGES IN THE CONFIGURATION OF THE CRANE, PLACEMENT, RIGGING, LIFTING SCHEME, ETC., OR CHANGES IN ANY OF THE CALCULATIONS REQUIRE THAT A NEW LIFT PLAN BE DEVELOPED.

<p style="text-align: center;"><b>X</b></p> <p style="text-align: center;">SIGNATURE OF OPERATOR      DATE</p>	<p style="text-align: center;"><b>X</b></p> <p style="text-align: center;">SIGNATURE OF RIGGER      DATE</p>
<p style="text-align: center;"><b>X</b></p> <p style="text-align: center;">SIGNATURE OF LIFTING SUPERINTENDENT      DATE</p>	<p style="text-align: center;"><b>X</b></p> <p style="text-align: center;">SIGNATURE OF SAFETY SUPERVISOR      DATE</p>

**X - Required signatures prior to performing lifting operations.**



## PRE-LIFT GUIDELINES FOR ENGINEERED LIFTS

- Load chart utilized is for exact crane model; boom type, length, tip; counterweight.
- Pre-planning for communication (voice or radio).
- Pre-lift meeting held with crew.
- Underground structures and conditions have been considered.
- Footing is adequate for lift.
- Operations are far enough away from any shoring, trenching, or excavating that could cause collapse (1:1).
- Outriggers or crawler cranes are properly extended per load chart and wheels are clear of ground (if applicable).
- Applications of mats, cribbing and blocking has been considered and utilized when necessary. Blocking under outrigger pads meets area specifications (area = crane capacity divided by five). An example is a 100 ton crane / five requires a five foot x four foot area or twenty square feet.
- Swing path not over personnel.
- Minimum clearances from high voltage lines are and will be maintained throughout lift.
- The load radius has been measured.
- Sustained wind speeds not exceeding thirty miles per hour. Lower wind speeds considered (at the discretion of the operator, the lift may be delayed or canceled).
- Precautions taken to prevent the load from touching the boom at any time during the lift.
- For tandem lifts, plans have been discussed and reviewed with the operators.
- Tag lines are long enough, tied to the load, and in good condition.
- Adequate swing clearance between the counterweight and obstacles are maintained (properly barricaded).
- Boom composition is correct. Load block is of adequate capacity and sheaves are of proper size for hoist cable. Machine is rigged with proper number of parts of hoist line.
- All cranes have been verified plumb and level.
- No additional counterweight added unless designed/approved by the crane's manufacturer.
- All rigging equipment has been inspected for capacity and condition.
- Checklist completed one day prior to critical lift.

*"The above items have been accounted for prior to the lift (all must be answered yes)."*

The OSHA rule prohibits hoisting personnel by crane or derrick except when no safe alternative is possible. Based on the review of the record, OSHA determined that hoisting with crane- or derrick-suspended personnel platforms constitutes a significant hazard to hoisted employees and must not be permitted unless conventional means of transporting employees are not feasible or unless they present greater hazards. OSHA determined that compliance with the provisions of this standard will provide the best available protection for personnel being hoisted by these platforms in those limited situations where such hoisting is necessary. (The standard does not apply to Subpart R work.)

Where conventional means (e.g., scaffolds, ladders) of access would not be considered safe, personnel hoisting operations, which comply with the terms of this standard, would be authorized. OSHA stresses that employee safety—not practicality or convenience—must be the basis for the employer’s choice of method.

Cranes and derricks used to hoist personnel must be placed on a firm foundation and the crane or derrick must be uniformly level within 1 percent of level grade.

The crane operator must always be at the controls when the crane engine is running and the personnel platform is occupied. The crane operator also must have full control over the movement of the personnel platform. Any movement of the personnel platform must be performed slowly and cautiously without any sudden jerking of the crane, derrick, or the platform. Wire rope used for personnel lifting must have a minimum safety factor of five. (This means it must be capable of supporting five times the maximum intended load.) Rotation resistant rope must have a minimum safety factor of ten.

When the occupied personnel platform is in a stationary position, all brakes and locking devices on the crane or derrick must be set.

The combined weight of the loaded personnel platform and its rigging must not exceed 50 percent of the rated capacity of the crane or derrick for the radius and configuration of the crane or derrick.

The personnel platform must not be loaded in excess of its rated load capacity or its maximum intended load. Only personnel instructed in the requirements of the standard and the task to be performed—along with their tools, equipment, and materials needed for the job—are allowed on the platform. Materials and tools must be secured and evenly distributed to balance the load while the platform is in motion.

Prior to using a personnel platform - Exhibit K - “*Crane Supported-Personnel Platform Lift Planning & Authorization Form*” and Exhibit L - “*Personnel Platform Pre-Lift Inspection*” must be completed. These forms will guide the supervisor through steps to assure compliance with OSHA requirements and a resulting safe lift of personnel.

### **Trial Lift**

A trial lift of the unoccupied personnel platform must be made before any employees are allowed to be hoisted. During the trial lift, the personnel platform must be loaded at least to its anticipated lift weight. The lift must start at ground level or at the location where employees will enter the platform and proceed to each location where the personnel platform is to be hoisted and positioned. **The trial lift must be performed immediately prior to placing personnel on the platform.**

The crane or derrick operator must check all systems, controls, and safety devices to ensure the

following:

- They are functioning properly.
- There are no interferences.
- All boom or hoisting configurations necessary to reach work locations will allow the operator to remain within the 50-percent load limit of the hoist's rated capacity.

If a crane or derrick is moved to a new location or returned to a previously used one, the trial lift must be repeated before hoisting personnel.

After the trial lift, the personnel platform must be hoisted a few inches and inspected to ensure that it remains secured and is properly balanced.

Before employees are hoisted, a check must be made to ensure the following:

- Hoist ropes are free of kinks.
- Multiple part lines are not twisted around each other.
- The primary attachment is centered over the platform.
- There is no slack in the wire rope.
- All ropes are properly seated on drums and in sheaves.

Immediately after the trial lift, a thorough visual inspection of the crane or derrick, the personnel platform, and the crane or derrick base support or ground must be conducted by a competent person to determine if the lift test exposed any defects or produced any adverse effects on any component or structure. Any defects found during inspections must be corrected before hoisting personnel.

When initially brought to the job site and after any repair or modification, and prior to hoisting personnel, the platform and rigging must be proof tested to at least 125 percent of the platform's rated capacity. (Some states may have greater testing percentages.) This is achieved by holding the loaded platform-with the load evenly distributed-in a suspended position for 5 minutes. Then a competent person must inspect the platform and rigging for defects. If any problems are detected, they must be corrected and another proof test must be conducted. Personnel hoisting must not be conducted until the proof testing requirements are satisfied.

### **Pre-Lift Meeting**

The employer must hold a meeting with all employees involved in personnel hoisting operations (crane or derrick operator, signal person(s), employees to be lifted, and the person responsible for the hoisting operation) to review the OSHA requirements and the procedures to be followed before any lift operations are performed.

This meeting must be held before the trial lift at each new work site and must be repeated for any employees newly assigned to the operation.

### **Safe Work Practices**

Employees, too, must contribute to safe personnel hoisting operations and help to reduce the number of accidents and injuries associated with personnel hoisting operations. Employees must follow these safe work practices:

- Use tag lines unless their use creates an unsafe condition.
- Keep all body parts inside the platform during raising, lowering, and positioning.
- Make sure a platform is secured to the structure where work is to be performed before entering or exiting it, unless such securing would create an unsafe condition.



- Wear a body belt or body harness system with a lanyard. The lanyard must be attached to a structural member within the personnel platform. If the hoisting operation is performed over water, the requirements 29 CFR 1926.106—*working over or near water*—must apply.
- Stay in view of, or in direct communication with, the operator or signal person.

Crane and derrick operators must follow these safe work practices:

- Never leave crane or derrick controls when the engine is running or when the platform is occupied.
- Stop all hoisting operations if there are indications of any dangerous weather conditions or other impending danger.
- Do not make any lifts on another load line of a crane or derrick that is being used to hoist personnel.

# Exhibit K



Today's Date: \_\_\_\_\_

## Crane Supported-Personnel Platform Lift Planning & Authorization Form

Items 1-4 completed by  
Personnel Lift Supervisor

- 1) Location: \_\_\_\_\_ Personnel Lift Supervisor: \_\_\_\_\_
- 2) Purpose of lift: \_\_\_\_\_
- 3) What are the alternatives to the Personnel Lifting Methods? \_\_\_\_\_  
\_\_\_\_\_
- 4) Why are they not being used? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Balance of form to be completed by Personnel Lift Authorizer

- 1) Hoisting Equipment: \_\_\_\_\_ Equipment Number: \_\_\_\_\_
- 2) (A) Platform ID: \_\_\_\_\_ (B) Platform Rating: \_\_\_\_\_ (C) Platform Weight: \_\_\_\_\_

3) (A) Maximum expected radius: \_\_\_\_\_  
(B) Rated load at radius: \_\_\_\_\_  
(C) Max. load lift [50% of 3(B)]: \_\_\_\_\_

(D) Number of occupants: \_\_\_\_\_ X 250 lbs  
(250 lbs is industry average for man and tools)  
(E) Total wt. expected [2(C)+3(D)]: \_\_\_\_\_

Maximum Personnel Platform Lift Capacity:

3(E) can never exceed 3(C)

- 4) Pre-lift Proof Test performed (125%) \_\_\_\_\_ Subsequent lift performed (visual inspection) \_\_\_\_\_
- 5) Was the area around the outriggers inspected for indications of base failure? \_\_\_\_\_
- 6) How are constant communications being addressed? \_\_\_\_\_
- 7) Will electrical clearances be maintained? \_\_\_\_\_ If not, are lines de-energized? \_\_\_\_\_
- 8) Has platform and suspension rigging been inspected? \_\_\_\_\_ By whom? \_\_\_\_\_
- 9) Pre-lift Briefing Held: \_\_\_/\_\_\_/\_\_\_ \_\_\_\_\_ AM/PM - Attendees: \_\_\_\_\_  
\_\_\_\_\_
- 10) Anticipated Hazards (wind, weather, visibility, power lines, etc.) \_\_\_\_\_  
\_\_\_\_\_
- 11) Lift Accomplished Date: \_\_\_\_\_ Time: \_\_\_\_\_
- 12) Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Personnel Lift Authorizer Signature      Date  
(Crane Operator)

Personnel lifting systems - ANSI Standard - ASME B30.23-1998

# Exhibit L



Today's Date: \_\_\_\_\_

**Personnel Platform Pre-Lift Inspection**  
(ANSI Appendix II)

Inspector: \_\_\_\_\_ Platform ID#: \_\_\_\_\_

1) Markings	Satisfactory	Unsatisfactory
➤ Platform (All Information Legible)	_____	_____
➤ Suspension System	_____	_____
2) Structure		
➤ Load Supporting Welds/Bolts	_____	_____
➤ Load Supporting Members	_____	_____
➤ Barriers from toeboard to Intermediate rail	_____	_____
➤ Handrail	_____	_____
➤ Fall Protection Anchorage Points	_____	_____
➤ Gate Locking Mechanisms	_____	_____
3) Attachment Mechanisms		
➤ Pins/Ears/Bolt-ups/Eyes (Circle appropriate)	_____	_____
➤ Wire Rope/Chain/Rigid Leg (Circle one)	_____	_____
➤ Master Links	_____	_____
4) Special Purpose Items		
(Overhead Protection, Personal Flotation Devices, Tag lines, etc.)		
List: (1) _____	_____	_____
(2) _____	_____	_____
(3) _____	_____	_____

General Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Personnel Lift Supervisor Signature



## Safety Program

### D. Policy and Procedures

Reviewed: January 4, 2019

Effective: November 7, 2005

## Demolition

Before starting a demolition/renovation job, The Boldt Company will take a number of steps to safeguard the health and safety of workers at the job site. These steps involve the overall planning of the demolition/renovation job, including methods to be used, the equipment necessary to do the job, and the measures to be taken to perform the work safely. Planning for a demolition/renovation job is as important as actually doing the work. Therefore, a competent person experienced in all phases of the demolition/renovation work to be performed will perform all planning of work.

The American National Standards Institute (ANSI) in its ANSI A10.6-1990 - Safety Requirements for Demolition Operations states:

“No employee will be permitted in any area that can be adversely affected when demolition operations are being performed. Only those employees necessary for the performance of the operations shall be permitted in these areas.”

### Preplanning

Prior to starting all demolition/renovation operations, OSHA Standard 1926.850(a) requires that a competent person conduct an engineering survey of the structure. The purpose of this survey is to determine the condition of the framing, floors, and walls so that measures can be taken, if necessary, to prevent the premature collapse of any portion of the structure. When there are signs or concerns with adjacent structure(s) or future improvements, these need to be similarly checked. Boldt will maintain a written copy of this survey. Documentation, including photographs of existing damage in neighboring structures is also advisable.

Boldt will plan for the wrecking of the structure, the equipment to do the work, manpower requirements, and the necessary protection of the public. The safety of all workers on the job site is a prime consideration. During the preparation of the engineering survey, Boldt will pre-plan for potential hazards such as fire, cave-ins, etc. and conditions to minimize injuries.

The structure to be demolished/renovated will be checked throughout for materials containing asbestos, lead, or other known or suspected hazardous materials, with particular attention paid to fire protection and heating, ventilating and air conditioning duct work. All painted surfaces need to be checked for lead. If asbestos or lead is detected, it will be removed according to applicable standards and regulations. Under normal procedures, these activities would be outsourced and not performed by The Boldt Company.

A completed assessment of the facility shall be completed prior to any demolition work to start. A report must be completed, stating the confirmation of the abatement and the report must be available during demolition/renovation process.

If the structure has been damaged by fire, flood, explosion, or some other cause, appropriate measures, including bracing and shoring of walls and floors, will be taken to protect workers and any adjacent structures. It will also be determined if any type of hazardous substances have been used or stored on the site. If the nature of a substance cannot be easily determined, samples will be taken and analyzed by a qualified person prior to demolition/renovation.

During the planning stage of the job, all safety equipment needs will be determined. Personal protective equipment, warning signs, fall protection systems and other worker protection as deemed necessary during the engineering survey. Special training may also be necessary. (I.e. confined space)

One of the most important elements of the pre-job planning is the location of all utility services. All electric, gas, water, steam, sewer, and other services lines will be shut off, capped, or otherwise controlled, at or outside the building before demolition/renovation work is started.

If it is necessary to maintain any power, water, or other utilities during demolition/renovation, such lines will be temporarily relocated as necessary and/or protected. The location of all overhead power sources will also be determined, as they can prove especially hazardous during any machine demolition. Workers will be informed of the location of any existing or relocated utility service. In all cases, any utility company that is involved will be notified in advance, and its approval or services, if necessary, will be obtained.

Provisions will be made for prompt medical attention in case of serious injury. The nearest hospital, infirmary, clinic, or physician will be indicated as part of the initial survey. The job supervisor will be knowledgeable of these facilities and capable of summoning expedient assistance. Proper equipment for rescue of an injured worker, as well as a communication system to contact any necessary ambulance service, will be available at the job site. The telephone numbers of the police, fire, ambulance, hospital or 911 services will be conspicuously posted. Each site will also have someone who has a valid certificate in First Aid/CPR and/or AED training. A properly stocked first aid kit as determined by an occupational physician will be available at the job site.

### **Fire Prevention**

A “fire plan” will be set up prior to beginning a demolition/renovation job. This plan will outline the assignments of key personnel in the event of a fire and provide an evacuation plan for workers on the site. Common sense will be the general rule in all fire prevention planning, as follows:

- All potential sources of ignition will be evaluated and the necessary corrective measures taken.
- Electrical wiring and equipment for providing light, heat, or power will be installed by a competent person and inspected regularly.
- Equipment powered by an internal combustion engine will be located so that the exhausts discharge well away from combustible materials and away from workers.
- When the exhausts are piped outside the building, a clearance of at least six inches will be maintained between such piping and combustible material.
- All internal combustion equipment will be shut down prior to refueling. Fuel for this equipment will be stored in a safe location.
- Sufficient firefighting equipment will be located near any flammable or combustible liquid storage area.

Only approved containers and portable tanks will be used for the storage and handling of flammable and combustible liquids.

Heating devices will be situated so that they are not likely to overturn and will be installed in accordance with their listing, including clearance to combustible material or equipment. Competent personnel will maintain temporary heating equipment, when utilized.

Smoking will be prohibited at or in the vicinity of hazardous operations or materials. Where smoking is permitted, safe receptacles will be provided for smoking materials.

Roadways between and around combustible storage piles will be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other materials. When storing debris or combustible material inside a structure, such storage will not obstruct or adversely affect the means of exit.

A suitable location at the job site will be designated and provided with plans, emergency information, and equipment, as needed. Access for heavy fire-fighting equipment will be provided on the immediate job site at the start of the job and maintained until the job is completed. An ample number of fully charged portable fire extinguishers will be provided throughout the operation.

### **General Protection**

During demolition/renovation, inspections by a competent person will be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, walls or loosened material. No worker will be permitted to work where such hazards exist until they are corrected by shoring, bracing or other effective means.

A standard system will be utilized for signaling the crane operator. All personnel assigned to such operations will be fully instructed in and knowledgeable of these signals.

All sidewalks or public thoroughfares adjacent to or near enough to be affected by the work will be closed, relocated or protected. Travel ways that must be used by the public will be kept clear, clean and unobstructed at all times. Whenever possible, pedestrian and vehicular traffic will be prohibited from using any area closer to the perimeter of the structure being demolished than one-fourth of the height of that structure being demolished. Where pedestrian traffic cannot be relocated and is required to use an area closer to the perimeter than one-fourth of the height of the structure being demolished, a substantial sidewalk shed or equivalent will be constructed over the entire length of such public-use route that is adjacent, adjoining, contiguous, or abutting the structure to be demolished.

The sidewalk shed or equivalent will be lighted by natural light or by artificial means, if needed, to a degree sufficient to ensure adequate illumination for safety.

Roofs of sidewalk sheds or the equivalent, will be capable of safely sustaining a load of 150 pounds per square foot, and be a minimum of 8 feet above the walk.

During hours of darkness, appropriate warning lights will be securely placed on or about all barricades within public streets and elsewhere as needed.

Where there is high exposure to the public because of location, size or other special aspects of the operation, a security guard or appropriate alarm service will be provided when work is not in progress to prevent and control fires, to prevent the public from entering the area and to maintain all danger signs, lights, barricades or other public protection devices. Proper perimeter protection will also be provided.

### **Facilities Arrangements**

#### Chutes:

- Material can only be dropped through chutes to a specific point lying outside the exterior walls of the structure unless all persons have been effectively excluded by barriers from the area.
- The openings will not exceed 42 inches in height, measured along the wall of the chute at all stories below the top floor. Such openings will be kept closed when not in use.
- Chutes will be designed and constructed to eliminate hazards of impact of materials or debris loaded therein. This can be accomplished by the use of substantial wood or steel materials in the construction of the chutes, by the inclusion of paddles or baffles, or other controlling devices to slow the flow of the material, and by changing the direction of the chutes not less than once every 120 feet. Under no circumstances will any workers enter into the chutes to clear or unplug the material.

- Any space between the chute and the edge of the opening in the floor through which it passes will be solidly covered.
- A substantial gate will be installed in each chute at or near the discharge end. A competent person will be assigned to control the operation of the gate, and the backing and loading of trucks. Persons will be prevented from standing or passing under or near the discharge end of the chute.
- When operations are not in progress, the chute will be closed or otherwise secured. Any openings into which workers dump debris at the top of a chute will be protected by a substantial guardrail 42 inches above the floor or other surface on which the workers stand to dump the material.
- When the material is dumped into a chute, a securely attached toe board will be provided.

#### Removal of Materials through Floor Holes:

- Any openings cut in a floor for the disposal of materials will be no larger than 25 percent of the aggregate of the total floor area unless the lateral supports of the floor system remain in place. Floors weakened or otherwise made unsafe by demolition/renovation operations will be shored to carry the original design loads with the original factor of safety.
- The total area of a floor will be computed from measurements taken to the inside faces of the exterior walls. The area of floor openings that existed prior to beginning demolition/renovation of the structure will not be deducted in computing the total area.
- Solid planking, barricades or guardrails will protect openings in floors below the demolition/renovated floor, unless the floor is completely sealed off.

#### Stairs, Passageways and Ladders:

- Only those stairways, passageways and ladders designated as means of access to the structure or building will be used. Other access ways will be entirely closed off.
- In a multi-story building, when a stairwell is being used, it will be illuminated by either natural or artificial means and completely covered over at a point not less than two floors below the floor on which demolition/renovation work is being performed. Access to the floor where the demolition/renovation work is in progress will be through an illuminated, protected and separate passageway.

#### Removal of Walls, Foundations, Masonry Sections and Chimneys:

- A qualified person will determine whether masonry walls or other sections of masonry will be permitted to fall upon the floor of the building due to the impact potentially exceeding the safe carrying capacities of the floors.
- No wall section more than one story in height will be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand to a greater height without such lateral support and is in a condition to be self-supporting. All walls will be left in a stable condition at the end of each shift.
- Workers will not be permitted to work on the top of a wall when severe weather conditions such as ice, snow or wind constitute a hazard.
- Structural or load supporting members on any floor will not be cut or removed until all stories directly above such floor have been demolished and removed.
- All floor openings within 10 feet of any wall being demolished will be planked solid, except when workers are kept out of the area below those floor openings.
- In buildings of skeleton-steel construction, the steel framing may be left in place during the demolition of masonry. Where this is done, all steel beams, girders and similar structural supports will be cleared of all loose material as the masonry demolition progresses downward.
- Walkways will be provided to give workers safe access to reach or leave any wall or scaffold.
- In demolishing brick or masonry chimneys or stacks that cannot safely be toppled, all material

will be dropped on the inside of such chimneys or stacks unless job conditions permit dropping materials on the outside.

- Should it be necessary to demolish a chimney or stack manually, safe access to the top will be provided to prevent the workers from falling during their climb to and from and while working on top of the chimney or stack.
- If the loading-out operation is done simultaneously with the demolition of a smokestack or chimney, the workers in the demolition discharge area will be protected with planking having a nominal thickness not less than 3 inches, closely and evenly laid, and properly secured.

#### Storage:

- Storage space into which material is dumped will be blocked off, except for openings necessary for the removal of material. Such openings will be kept closed at all times when material is not being removed.

### **Flame Cutting And Related Operations**

Only approved torches with anti-flash devices will be used. Oxy-fuel gas and electric welding, cutting and heating equipment will be kept in working condition, inspected periodically and when found to be defective, promptly repaired by qualified personnel or withdrawn from service. Connections will be checked for gas tightness after assembly and before lighting the torch. Periodic testing for gas leaks will be done with the use of soapy water or the equivalent. A flame will not be used for testing.

A welder or welding operator will comply with the following when lighting a torch: use the friction lighter, stationary pilot flame or some other suitable source of ignition; do not use matches for lighting torches; do not attempt to light or relight a torch from hot metal where gas might accumulate in a small cavity, hole, furnace, etc.; and point the torch away from persons or combustible materials.

In order to eliminate the possibility of gas escaping through leaks or improperly closed valves when gas welding or cutting in a confined space, the torch valves will be closed and the fuel gas and oxygen supply to the torch positively shut off at a point outside the confined area whenever the torch is not used for extended period of time, such as during lunch period/break or overnight. Where it is practicable, the torch and hose will be removed from the confined space.

Oxygen will not be used as a substitute for compressed air. Oxygen will not be used: to actuate pneumatic tools, in oil preheating burners, to start internal combustion engines, to blow out pipelines, to dust clothing, to create pressure, or to ventilate areas. Jets of oxygen will not be permitted to strike an oily surface or greasy clothes, or to enter fuel oil or other storage tanks.

Cylinders, cylinder valves, couplings, regulators, hoses and their apparatus will be kept free from oily or greasy substances. Oxygen cylinders or their apparatus will not be handled with oily hands or gloves. All pressurized cylinders will be secured in an upright position at all times. The temperature of the cylinder contents will not be allowed to exceed 130 F. Only approved cylinders will be used.

Oxygen cylinders in storage will be separated from fuel gas cylinders, reserve stocks of carbides or highly combustible materials (especially oil or grease) a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire resistance rating of at least ½ hour. Cylinders will not be dropped, struck or permitted to strike objects in a manner that may damage the cylinder, valve or safety devices.

Bars will not be used under valves or valve protection caps to pry cylinders loose when frozen to the ground or otherwise fixed. Whether full or empty, cylinders will never be used as rollers or supports. Safety devices will not be tampered with.

Cylinder valves will be closed before moving cylinders.



Where the cylinder is designated to accept a cap, valve protection caps will always be in place and hand tightened (except when cylinders are in use or connected for use).

Valve protection caps are designed to protect cylinder valves from damage.

Valve protection caps will not be used for lifting cylinders from one vertical position to another.

When transporting cylinders by a crane or derrick, a cradle or suitable platform will be used. Slings or electromagnets will not be used for this purpose.

Before connecting a regulator to a cylinder valve, the valve will be opened momentarily and closed immediately. This is generally termed “cracking” and is intended to clear the valve of dust or dirt.

A hammer or wrench will not be used to open cylinder valves that are fitted with hand wheels.

Cylinders not having a fixed hand wheel will have keys, handles or nonadjustable wrenches on valve stems while these cylinders are in service so that the gas flow can be turned off quickly in case of emergency. When a high-pressure (no liquefied) gas cylinder is in use, the valve will be opened fully in order to prevent leakage around the valve stem.

Any acetylene cylinder valve will not be opened more than approximately 1 ½ turns and preferably no more than ¾ of a turn.

Only approved manifolds will be used.

Torch cutting on galvanized steel or other metals, covered with protective coatings may produce toxic fumes or gases. Appropriate respiratory protection or adequate ventilation will be provided. Cutting of non-ferrous metals such as brass or bronze on stainless steel alloys can also generate toxic metal fumes (Contact the Safety Dept. for guidelines and necessary precautions).

Ample ventilation will be provided when cutting cast iron, alloys, or stainless steel metals with oxygen using either a chemical flux or iron powder in a confined space.

Liquid oxygen tanks will not be stored on asphalt surfaces.

### **Tank Or Vessel Removal**

An approved confined space entry program will be followed for work within confined spaces (See Boldt Safety Program, Confined Space Entry). All employees required to enter confined spaces will be instructed as to the nature or the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required.

Prior to dismantling of any tank or vessel, a survey will be made to determine the previous usage of the tank.

Tanks, vessels or other confined spaces will be tested for both flammable and toxic vapors both before and during all work on them. All necessary precautions such as cleaning, purging, providing proper respiratory equipment, etc. will be taken. All lines previously feeding into or discharging from the tank or vessel will be disconnected before any work is done.

If the tank or vessel previously contained a toxic substance, the substance must be positively identified and appropriate control measures must be followed based on the toxic properties of the substance.

## **Removal Of Steel And Special Construction Buildings**

Prior to the erection of any derrick, crane or other hoisting device on any floor, proper support such as shoring/re-shoring, if necessary, will be designed and erected in accordance with accepted engineering requirements and in compliance with ANSI A10.13-1988.

When floor arches have been removed, planking will be provided for the workers engaged in razing the steel framing.

A tag line or guide rope will be used where appropriate on hoisted or lowered loads. A tag line will be attached to a member to keep it from swinging during dismantling. Entire dependence should not be placed upon tag lines; an attempt should always be made to locate and to hook up to the center of gravity to help prevent the load from swinging freely.

All structural steel will be lowered, rather than permitted to drop, except into a specially barricaded or otherwise fully protected area.

A structural member being dismantled will not be put under undue additional stress. Special precautions will be taken in the demolition of pre-stressed and post-tensioned concrete because of the danger of premature collapse and sudden release of energy.

## **Mechanical Means Demolition**

No portion of a structure will be demolished by mechanical means: (1) a crane equipped with a demolition ball or (2) a clamshell bucket, a backhoe or a tractor when the portion being demolished is more than four times higher than its distance from an area being used by either pedestrian or vehicular traffic, unless any of the following approved perimeter protection is provided:

- A crane equipped with a clamshell bucket or demolition ball attachment will not be swung over the heads of employees or over active public right of way.
- A tractor with or without an attached wrecking pole or similar device will not be used to wreck any structure with a maximum height in excess of 40 feet.
- No structure will be demolished by a crane or backhoe when the boom is less than 5 feet above the height of the building.
- The demolition ball will be attached to the load line with a swivel-type connection to prevent twisting of the load line and will be attached by positive means in such a manner that the ball cannot become disconnected by slack in the load line or other causes. The use of tires for the swivel connection is prohibited.
- Caution will be exercised to prevent overloading of fire escapes with debris and their subsequent collapse. Down spouts and risers will be removed as the work progresses.

The weight of the demolition ball will not exceed 50 percent of the crane's rated capacity based on the length of the boom and the maximum angle of operation at which the demolition ball will be used, nor will the weight of the demolition ball exceed 25 percent of the nominal breaking strength of the lines by which it is suspended, whichever results in a lesser weight.

Under no circumstances will a person be allowed to ride on or work from a demolition ball.

Properly leveled outriggers will be used on truck-mounted cranes for demolition operations.

Before pulling over walls or portions thereof with a demolition ball or clamshell bucket, or by attachment of a wire rope, all affected lateral members will have been cut free.

When operating or moving cranes or other heavy equipment in the vicinity of underground or overhead power cables, extreme caution will be exercised while equipment is being operated. In

addition to informing personnel of the location of underground and overhead power cables, these locations, if possible, should be marked. All utilities must be located before any demolition project begins.

When there is a possibility of excessive vibrations due to demolition operations, seismic or vibration tests will be taken to determine proper safety limits to prevent damage to adjacent or nearby buildings, utilities or other property.

Mobile cranes, wire rope, and other hardware, will be inspected prior to initial use.

The extra weight of mechanical equipment will be taken into consideration when working over vaults, underground tanks, etc.

### **Survey Of Job Site**

Construction and demolition/renovation workers are subject to certain hazards that cannot be eliminated by mechanical means and must be controlled by care, common sense and intelligence. Boldt will make a survey of the conditions of the site to determine the hazards, the kind and number of safeguards that will be installed, and any other precautions to minimize exposure. The survey will include, but not be limited to the following:

1. Safe access and movement:
  - Work areas
  - Walkways, runways and passageways
  - Ladders, stairways and elevators
  - Protection for floor and roof openings
  - Illumination
2. Vehicles:
  - Roads: turnaround space, parking area and storage/staging areas
  - Materials storage areas and debris areas
  - Signs and signals to route vehicles on the job
  - Maintenance and repair of vehicles
3. Utilities and service:
  - Location of temporary buildings
  - Location and identification of high-voltage lines
  - Location of sanitary facilities and drinking water
4. Scheduling work for safety:
  - Providing safety equipment on the job, such as hard hats, safety harnesses and lanyards, eye protection, work vests etc.
  - Establishing liaison among contractors to prevent congestion among trades.
  - Providing temporary flooring, signage and scaffolding where required.
5. Work procedure:
  - Space
  - Equipment such as cranes, hoists, elevators and trucks.
  - Rigging procedures
6. Tools and Equipment:
  - Repair, maintenance and care
  - Inspection
  - Supplies of tools for each job

7. Workers and Supervision:

- Job Assignment
- Training
- Number of workers
- Plans for maintaining safety (safety management): Safety bulletins/newsletters, record charts and posters/calendars, recognition for groups or individuals, investigation and reporting on reportable incidents, knowledge of safety orders, safety meetings, and specific safety instructions for new employees (orientation).
- Establishment of provisions to take immediate action to correct unsafe conditions or acts
- First aid and medical treatment of injuries

8. Hazard recognition:

- Health - Examples: asbestos, chemicals, residue points, silica, lead, etc.
- Noise levels
- Confined spaces
- Dust, contaminants and their sources

## DEFINITIONS

AMPLE (strength): More than adequate; or greater capacity, size, strength, volume, extent or scope than the minimum required.

CHUTE: A trough or tube used to guide and transport sliding objects, materials or debris from a higher to lower level.

COMPETENT PERSON: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous or dangerous to employees and who has the authorization to take prompt corrective measures to eliminate them.

DEMOLITION/RENOVATION: Dismantling, razing, destroying or wrecking any building or structure or any part thereof and restoring to a former better state.

DEMOLITION BALL: A large steel weight suspended from a crane boom and used to demolish by impact.

EQUIVALENT: An alternate design, feature, device or protective action that provides an equal degree of safety.

HAZARDOUS SUBSTANCE: A substance that is toxic, corrosive, a strong sensitizer, flammable, or explosive.

PERSONNEL PROTECTIVE EQUIPMENT: Any gloves, shoes, hard hats, clothing, respiratory equipment, glasses, etc., designed to protect a worker from injury and health hazards.

QUALIFIED PERSONS: Those who by possession of a recognized degree, certificate or professional standing or by extensive knowledge, training and experience in the demolition industry have successfully demonstrated their ability to solve or resolve problems relating to the subject matter of this standard.

SIDEWALK SHED: A protective structure located upon any route used as a pedestrian or vehicular passageway and subjected to debris and falling object hazards as a result of operations being performed.

*STANDARD*: An established measure, type, model for example. In the document, it refers to an American National Standard or a similarly established recognized and accepted standard (OSHA).

*SUBSTANTIAL*: Strong, stout, solid, firm; meeting not less than the obvious intent of this standard.

*TEMPORARY WALKWAY*: A pedestrian passageway established to route pedestrians around a demolition operation, when their normal route is considered unsafe.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: February 1, 2006

## Disciplinary Policy and Procedure

Safety requires constant day-to-day attention from everyone on the project. It is for this reason that each employee must follow the safety rules and regulations of The Boldt Company, the federal and state agencies, and the owner for whom the work is being done. In order to ensure a safe place for each employee, Boldt has developed a Disciplinary Policy and Procedure to enforce these safety rules and regulations.

A safety violation occurs when an employee violates: company policies and procedures, employee safety and/or work rules, or is engaged in unsafe work practices.

As a result of a safety violation, the employee may be subject to one of the following disciplinary actions:

- First Violation: Warning
- Second Violation of Similar Safety Rule: Suspension without pay
- Third Violation of Similar Safety Rule: Termination

In each case, the employee may be provided a written safety violation notice. A copy of the notice will be issued to the employee's project manager and the Safety Department (Exhibit A).

Nothing in this policy prohibits the immediate dismissal or removal from the jobsite of any employee whose conduct constitutes a serious violation of the safety requirements that could cause serious danger to the employee, co-workers, property, equipment, or the employees of others.

### Enforcement

Implementation of the Disciplinary Policy and Procedure is to be carried out by the Foremen, Project Superintendents, Project Manager, and the Safety Department. It is the responsibility of each person mentioned to see that all safety requirements are followed by all personnel and those warnings are issued as required under this policy and procedure.

### Issuance Of Safety Violation Notice

When issuing a safety violation notice, meet with the employee(s) to discuss the safety infraction. Inform the individual(s) of the rule or procedure that was violated and the corrective action to be taken. Complete the safety violation notice in its entirety and issue the copies as directed on the form.

Questions regarding the Disciplinary Policy and Procedure are to be directed to the Safety Department.

### Supervisor Responsibility

The on-site supervisory personnel will be judged by the same rules as field employees and will bear responsibility for overall site conditions. Project Managers, members of the Safety Department, and other company officials will make physical inspections of the jobsites.

If an inspection of activities and areas indicates violations showing overall lack of commitment to company safety goals, the project superintendent, and/or foreman will be issued the following:

- A written warning will be issued for the first offense.
- Two written warnings will be considered cause for suspension and/or demotion.
- Three written warnings will be considered cause for dismissal.

\*Failure to institute corrective procedures after top management has ordered them will be considered insubordination and cause for dismissal. It is required that the suspension and termination process be completed under the direction of the Project Manager and/or the Executive within the respective operating group.

# Exhibit A – Safety Violation Notice



## Safety Violation Notice

Employee Name \_\_\_\_\_

Occupation/Craft \_\_\_\_\_

Date \_\_\_\_\_ Project Number \_\_\_\_\_

Project Location \_\_\_\_\_

Violation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Action Taken: Warning  Date \_\_\_\_\_  
(check one)

Suspension  Dates Suspended \_\_\_\_\_

Termination  Date Terminated \_\_\_\_\_

Other  Explain \_\_\_\_\_

Issued by \_\_\_\_\_ Date \_\_\_\_\_

Title \_\_\_\_\_

Supervisor Signature \_\_\_\_\_ Date \_\_\_\_\_

Distribution: Employee  
Project Manager  
Safety Department

Employee has received an explanation of the violation and acknowledges receipt of this Safety Violation Notice.

Employee Signature \_\_\_\_\_ Date \_\_\_\_\_

(SV-2) 02/06





## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 18, 2001

## Electrical Safety Related Work Practices

This policy covers electrical safety work practices for unqualified persons working on, near, or with electrical wiring. Unqualified persons are those with little or no electrical training. Qualified persons are those who have training, and demonstrated skills and knowledge in avoiding and resolving the electrical hazards of working on or near exposed energized parts (i.e. electrician).

### Training

All employees will be trained in electrical safety related work practices and clearance distances that pertain to their job assignments.

Unqualified employees who risk electric shock must be trained in and familiar with any electrically related safety practices that pertain to their respective job assignments and related job duties. This training will be part of the employee's on-the-job training when job assignments are made.

### Safety Related Work Practices

Safety related work practices must be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety related work practices must be consistent with the nature and extent of the associated electrical hazards.

Live parts to which an employee may be exposed must be de-energized before the employee works on or near them, unless:

- A qualified electrician can demonstrate that de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.
- If the exposed live parts are not de-energized, other safety-related work practices must be used to protect employees who may be exposed to the electrical hazards involved. Such work practices must protect employees against contact with energized circuit parts directly with a part of their body or indirectly through some other conductive object.
- The work practices that are used must be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts.

### WORKING ON OR NEAR EXPOSED DE-ENERGIZED PARTS

Conductors and parts of electric equipment that have been de-energized but have not been locked out or tagged must be treated as energized parts.

While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts must be locked out or tagged or both in accordance The Boldt Company Lockout-Tag out Procedure.

Safe procedures for de-energizing circuits and equipment must be determined before circuits or equipment is de-energized.

- The circuits and equipment to be worked on must be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.
- Stored electric energy which might endanger personnel must be released. Capacitors must be discharged and high capacitance elements must be short-circuited and grounded, if the stored electric energy might endanger personnel.
- Stored non-electrical energy in devices that could re-energize electric circuit parts must be blocked or relieved to the extent that the circuit could not be accidentally energized by the device. A lock and a tag must be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed. The lock must be attached so as to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.
- Each tag must meet the requirements of the Boldt Lockout-Tag out Procedure.
- A tag used without a lock must be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device. A qualified person must operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.
- A qualified person must use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and must verify that the circuit elements and equipment parts are de-energized.
- The test must also determine if an energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed even though specific parts of the circuit have been de-energized and presumed to be safe.
- If the circuit to be tested is over 600 volts, nominal, the test equipment must be checked for proper operation immediately before and immediately after this test. A qualified person must conduct tests and visual inspections as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed so that the circuits and equipment can be safely energized.
- Employees exposed to the hazards associated with re-energizing the circuit or equipment must be warned to stay clear of circuits and equipment.
- Each lock and tag must be removed by the employee who applied it. Removal of the lock or tag must be made according to the Boldt Lockout-Tag out Procedure. If removal must be made in the employee's absence, the Boldt Lockout-Tag out Procedure must be followed.
- There must be a visual determination that all employees are clear of the circuits and equipment.

### **Working On Or Near Exposed Energized Parts**

When working in an elevated position unqualified employees will stay at least ten (10) feet away from energized overhead lines with voltages of 50kV or below to ground. For voltages to ground over 50kV, the distance is ten (10) feet plus four (4) inches for every 10kV over 50kV.

Only qualified persons may work on electric circuit parts or equipment that has not been de-energized. These qualified persons must be capable of working safely on energized circuits and must be familiar

with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

If work is to be performed near overhead insulated lines, or insulated lines of 600 volts or greater, the lines must be de-energized and grounded, or other protective measures provided before work is started. If protective measures are provided (such as guarding, isolating, or insulating), these precautions must prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment. When a qualified person is working in the vicinity of un-insulated overhead lines, whether in an elevated position or on the ground, the person may not approach or touch any conductive object without an approved insulating handle.

The qualified person may not come closer to exposed energized parts than shown in the table:

<b>Voltage Range (Phase to Phase)</b>	<b>Minimum Approach Distance</b>
300V. and less	Avoid Contact
Over 300 V., not over 750V.	1 ft. 0 in.
Over 750V., not over 2kV	1 ft. 6 in.
Over 2kV., not over 15kV.	2 ft. 0 in.
Over 15kV., not over 37kV.	3 ft. 0 in.
Over 37kV., not over 87.5kV	3 ft. 6 in.
Over 87.5kV., not over 121kV.	4 ft. 0 in.
Over 121kV., not over 140kV.	4 ft. 6 in.

The qualified person must be insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation for the person from the energized part on which work is performed.) The qualified person must be insulated from the energized part and from all other conductive objects at a potential different from that of the energized part. Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines must be operated so that a clearance of ten (10) feet is maintained. If the voltage is higher than 50kV, the clearance must be increased four (4) inches for every 10kV over that voltage.

Employees may not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to perform the work safely.

Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near energized parts. Employees may not reach blindly into areas which may contain energized parts.

When an employee works in a confined or enclosed space that contains exposed energized parts, Boldt will provide, and the employee must use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like must be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

Conductive materials and equipment that are in contact with any part of an employee's body must be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects in areas with exposed live parts, Boldt must institute work practices (such as the use of insulation, guarding, and material handling techniques) which minimize, or eliminate, the hazard. Portable ladders must have nonconductive side rails due to the potential of contact with exposed energized parts. Metal ladders are not allowed on-site. Conductive articles of jewelry and clothing may not be worn if they might contact exposed energized parts.

Where live parts present an electrical contact hazard, employees may not perform housekeeping duties at such close distances to the parts that there is a possibility of contact unless adequate safeguards are provided. Electrically conductive cleaning materials may not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

Only a qualified person following specific procedures for electrical safety interlocks may defeat an interlock, and then only temporarily while he or she is working on the equipment. The interlock system must be returned to its operable condition when this work is completed.

Portable equipment must be handled in a manner which will not cause damage. Flexible electric cords connected to equipment may not be used for raising or lowering the equipment. Flexible cords may not be fastened with staples or otherwise hung in such a fashion as could damage the outer jacket or insulation.

Portable cord and plug-connected equipment and flexible cord sets must be visually inspected before use on any shift for external defects and for evidence of possible internal damage. Cord and plug-connected equipment and flexible cord sets which remain connected once they are put in place and are not exposed to damage, need not be visually inspected until they are relocated. If there is a defect or evidence of damage that might expose an employee to injury, the defective item must be removed from service, and no employee may use it until necessary repairs and tests to render the equipment safe have been made.

When an attachment plug is to be connected to a receptacle, the relationship of the plug and receptacle contacts shall first be checked to ensure that they are of proper mating configurations. A flexible cord used with grounding-type equipment must contain an equipment-grounding conductor.

Attachment plugs and receptacles may not be connected or altered in a manner which would prevent proper continuity of the equipment-grounding conductor at the point where plugs are attached to receptacles. Additionally, these devices may not be altered to allow the grounding pole of a plug to be inserted into slots intended for connection to the current carrying conductors.

Adapters which interrupt the continuity of the equipment grounding connection may not be used. Portable electric equipment and flexible cords used in highly conductive work locations, or in-job locations where employees are likely to contact water or conductive liquids must be powered through a ground fault circuit interrupter.

Employees' hands may not be wet when plugging and unplugging flexible cords and cord and plug-connected equipment if energized equipment is involved.

Energized plug and receptacle connections may be handled only with insulating protective equipment if the condition of the connection could provide a conducting path to the employees.

Locking-type connectors must be properly secured after connection.

### **Electric Power And Lighting Circuits**

Load rated switches, circuit breakers, or other devices specifically designed as disconnecting means must be used for the opening, reversing, or closing of circuits under load conditions. Cable connectors hot of the load break type, fuses, terminal lugs, and cable splice connections may not be used for such purposes, except in an emergency.

After a circuit is de-energized by a circuit protective device, the circuit may not be manually re-energized until it has been determined that the equipment and circuit can be safely energized. The repetitive manual re-closing of circuit breakers or re-energizing circuits through replaced fuses is prohibited.

Only qualified persons may perform testing work on electric circuits or equipment.

Test instruments and equipment and all associated test loads, cables, power cords, probes, and connectors must be visually inspected for external defects and damage before the equipment is used. If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item must be removed from service, and no employee may use it until necessary repairs and tests render the equipment safe.

Test instruments and equipment and their accessories must be rated for the circuits and equipment to which they will be connected and must be designed for the environment in which they will be used.

Where flammable materials are present, electric equipment capable of igniting them cannot be used, unless measures are taken to prevent hazardous conditions from developing. Such items include, but are not limited to, flammable gas, vapor, or liquid, combustible dust, and ignitable fiber(s) or filing(s).

Employees working in areas where there are potential electrical hazards must be provided with, and use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work being performed.

Protective equipment must be maintained in a safe, reliable condition and must be periodically inspected or tested. If the insulating capability of protective equipment may be subject to damage during use, the insulating material must be protected.

Employee must wear nonconductive head protection.

Employees must wear protective equipment for the eyes or face. All jewelry or other conductive material must be removed unless they can be rendered nonconductive by covering, wrapping, or other insulating means.

When working near exposed energized conductors or circuit parts, each employee must use insulated tools or handling equipment if the tools or handling equipment might make contact with such conductors or parts. If the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material must be protected.

Fuse handling equipment insulated for the circuitry voltage, must be used to remove or install fuses when the fuse terminals are energized. Ropes and hand lines used near exposed energized parts must be nonconductive. Protective shields, protective barriers, or insulating materials must be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur. When normally enclosed live parts are exposed for maintenance or repair, they must be guarded to protect unqualified persons from contact with the live parts.

The following alerting techniques must be used to warn and protect employees from hazards which could cause injury due to electric shock, burns, or failure of electric equipment parts:

- Safety signs, safety symbols, or accident prevention tags must be used where necessary to warn employees about electrical hazards which may endanger them.

- Barricades must be used in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas exposing employees to un-insulated energized conductors or circuit parts. Conductive barricades may not be used where they might cause an electrical contact hazard.

If signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant must be stationed to warn and protect employees.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

## Emergency Action Plan (Medical/First Aid)

### Scope and Application

Due to the complexity and variety of job sites encountered, this policy and procedure will be used as a general guideline to ensure employee health and safety from injuries that may occur as a result of fire and/or other emergencies encountered on a construction site. At times, the owner's specifications shall supersede information contained within this program; [only when it provides superior protection which would be advantageous for all personnel involved].

### First Aid

- On each site there is to be personnel first-aid/CPR certified by the American Red Cross or equivalent to perform rescue and medical duties. All injuries must be reported immediately to the designated person on-site. If care cannot be given on-site, an employee must be taken to a physician or hospital in the immediate area. In extreme cases, emergency personnel must be called to render assistance. The most expedient means must be taken to provide appropriate care.
- Each location must have a minimum of one first-aid kit on-site. Each kit must be placed in a conspicuous and easily accessible location unless each employee is otherwise informed as to its location. First-aid kits are made of weatherproof material to protect its contents.
- First-aid kits are equipped with items approved by a physician to be adequate for the potential hazards at the worksite they will be used. Each kit is checked to verify that it is properly stocked prior to being sent out. At the job, the kit must be checked to make sure expended items are replaced.
- In locations where the eyes or body may be exposed to corrosive or otherwise hazardous materials, suitable facilities must be provided within the work area (chemical/eye wash station(s)).
- Procedures for promptly transporting injured people to a hospital will be developed for each worksite that contacts the identified emergency responders and verifying that they can respond promptly.
- The superintendent and/or other designated representative will be responsible for accounting for all employees after the evacuation has occurred. This must be accomplished by checking brass, sign-in, etc.
- Each work-site must develop or use an owner's emergency procedure to provide a safe, efficient means of access/egress of emergency vehicles/personnel - see "Code Red" example (Exhibit A).
- The means of reporting emergencies will depend on the site specific circumstances. If the owner has an emergency response team such as an ambulance, EMT, etc. and a means of requesting assistance, that system must be utilized to report emergencies. Otherwise, the preferred means of reporting emergencies shall be 911 (or the equivalent number to contact local emergency response personnel). Emergency numbers and other pertinent information shall be conspicuously posted by telephones to provide necessary information to facilitate expedient response (Exhibit B and C).
- Each site must have a management representative (project manager, superintendent, foreman, etc.) that can be contacted for further information or explanation of the site specific plan. The Safety Department may also be contacted to verify or to implement a plan of action.

## **CareOnSite**

In some instances, such as Healthcare or other commercial projects, where there is no onsite Nurse's Station or First Aid Station, it may be necessary to utilize the Non-Emergency services of CareOnSite.

CareOnSite is a telephone triage service where the caller will speak to a Registered Nurse who will help to diagnose the caller's injury and provide instruction for treatment, or direct the caller to the appropriate facility if the injury is severe or treatment is beyond the caller's ability.

- For Emergencies, call 911
- For Non-Emergencies only, call CareOnSite – 833-522-9777

## **Alarm System**

Due to the various amounts of personnel that may be at the job site(s), a specific system must be provided allowing proper warning for necessary emergency action, or for adequate reaction time for safe escape from the immediate work area.

- Where alarm systems are provided by the owner, they will be utilized to provide notification to employees in the event of an emergency.
- When an owner's alarm system is not feasible for notification, other means must be implemented such as (but not limited to) the use of radios and/or telephones to warn employees of emergencies. When communication devices are used as a warning system, emergency messages must have priority over all other communication.
- On sites of ten or fewer employees, verbal communication may be used, in lieu of an alarm, as long as all employees are within verbal contact. If this is not possible, another means of alerting employees must be implemented.

## **Evacuation**

Each place of employment may have different hazards requiring evacuation. Depending on the hazards involved (natural, man-made, physical, etc.), appropriate procedures must be taken during emergency circumstances.

At each work site, there will be a predetermined location where employees meet if an evacuation occurs. If this occurs, it is essential that all employees meet at the predetermined area for accountability. This information is vital when emergency response personnel arrive on-site as to how they handle the situation. Report missing personnel to authorities and never re-enter the hazardous area until cleared by the authorities.

## **Severe Weather**

Each place of employment may have different hazards requiring personnel to seek shelter. Depending on the geographical region, appropriate procedures must be thoroughly addressed with the necessary actions to be taken during these potential emergency situations. At each work site, there will be a predestinated location where employees congregate in the event that severe weather is detected. If this occurs, it is essential that all employees meet at the predestinated area for safety as well as accountability. Care must be taken when selecting appropriate shelter(s). Items, such as capacity or numbers of shelter needed, must be part of the pre-planning process. This information must be communicated appropriately to personnel.



## **Training**

At each site, there must be a plan for potential emergencies that may be encountered on that specific site. The following training requirements must be completed.

- Training will include a review of the site specific emergency action plan including the method of alarm and predetermined evacuation routes and muster points.
- At each site, management/supervisory representatives must designate and train a sufficient amount of personnel to assist in an orderly and safe: evacuation and process to accommodate employees during severe weather.
- Each employee must be trained when the plan is initially developed, when the employee's responsibilities or actions change in accordance with the plan, or whenever the plan is changed.
- Employee training will include who to contact for additional information regarding the emergency action plan, and their responsibilities.
- The employee must receive training upon initial assignment as to the parts of the plan necessary for protection in the event of an emergency.
- A copy of the plan must be available on each site and made available for employee review, unless there are ten or fewer employees on-site; then the plan may be communicated verbally to employees.

## Exhibit A – Code Red



### “CODE RED”

#### Medical Emergency Procedure

In the event of a medical emergency, the call words “Code Red” must be used to alert all personnel carrying a radio on the project of an emergency. There must be a designated channel which will be used as a “Code Red” channel.

In the event of a “Code Red” the caller must be clear and precise. An example: “We have a Code Red - Code Red - Code Red - location in \_\_\_\_\_ problem \_\_\_\_\_ need assistance.” The caller must verify that they’ve been heard, and that assistance is on the way. The person that verifies the caller has been heard must inform other channels that a “Code Red” is in progress.

Designated first-aid and CPR certified personnel will respond to the emergency location to give emergency medical treatment. If additional medical treatment is necessary, an assigned individual must call emergency personnel (EMS [emergency medical services], ambulance, etc.).

There shall be assigned individuals that will maintain a clear path through the construction gates and flag/escort in emergency vehicles. Radios must be carried at all times. This is vital as it may become necessary to re-route emergency vehicles. The directions (such as: northeast end of the site) must be indicated to allow proper entrance of emergency personnel.

Once the EMS arrives on-site, project personnel must assist as directed/requested by EMS personnel. “Code Red” will remain in effect until treatment is complete or until personnel being treated are safely off-site. At that time, the designated management representative will call “Code Red Clear.” During the “Code Red,” any other personnel previously using the channel designated as the “Code Red” channel must use another designated channel until the “Code Red Clear” is issued. Radio communication on the “Code Red” channel must be exclusively for involved rescue/treatment personnel or coordination of EMS.

All incoming vehicles will be detained at the gate/entrance until the “Code Red” is cleared. This will keep traffic clear for EMS vehicles.

After an incident, the safety department as well as the owner must be contacted.

## Exhibit B – Emergency Information



### EMERGENCY INFORMATION

Job Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

#### EMERGENCY TELEPHONE NUMBERS

Ambulance: \_\_\_\_\_  
Fire: \_\_\_\_\_  
Police: \_\_\_\_\_  
Management Rep: \_\_\_\_\_  
After Hours: \_\_\_\_\_

#### NEAREST EMERGENCY FACILITIES

Hospital/Clinic: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

#### --EMERGENCY MANAGEMENT--

- Call for ambulance if injuries appear serious.
- Render first-aid if qualified to do so.
- Never move an injured person needlessly.
- Guide ambulance to injury site.
- Follow directions of emergency personnel.

Form No. S-5 (5/92)



## EMERGENCY INFORMATION

Job Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Management Rep: \_\_\_\_\_  
After Hours: \_\_\_\_\_

### UTILITY TELEPHONE NUMBERS

Electric: \_\_\_\_\_  
Gas: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Water-Sewer: \_\_\_\_\_  
Cable TV: \_\_\_\_\_

- State Statutes require that anyone engaging in or responsible for planning or performance of any type of excavation must provide advance notice of at least three (3) business days or more to underground facility owners affected by the excavation.
- State and federal safety standards state that the minimum safe working clearance from any overhead line is 10 feet. Greater clearance from any overhead line is 10 feet. Greater clearance is required for overhead lines exceeding 50,000 volts.
- In the event of an accident, keep the public and employees a safe distance from the damaged area and call the utility for repair service.

Form No. S-5A (7/98)

## Fall Prevention

### Purpose

To establish a fall control system for prevention/protection of personnel working at elevated heights.

### Objectives

Prevent employees from falling and/or minimize employee injury due to falls from elevated work areas. Identify work tasks that require fall prevention measures and/or fall protection equipment. Establish standards for the use of protective equipment and systems according to specific work tasks.

### Scope

When exposure to an elevated fall cannot be prevented through such measures as permanent or semi-permanent floors, walls, scaffolding, platforms, covers, personnel lifts, or guardrails, where feasible, personal fall protection equipment must be used to control a fall. This policy is in effect when a work task is being performed six (6) ft. or more above floor or ground level (lower heights need to be protected for certain customers or when regulatory agencies may require). It covers activities such as, but not limited to, steel erection, formwork, rebar, metal and precast decking, masonry, precast structure erection, machinery erection/rigging, scaffold erection, personnel lifts (boom and scissors), confined space entry, and excavations. The exception to this policy, as noted in the OSHA standards [1926.500(a)(1)], is when employees are making inspections, investigations, or assessment of workplace conditions prior to the actual start of the construction work or after all construction work has been completed.

### Procedures

#### Project Planning:

- A qualified person such as the project manager, superintendent, and foreman will be responsible for evaluating the appropriate fall control measures needed for a site specific fall protection system as a part of pre-planning the job/work task. They will also evaluate, prior to use, the strength and integrity of the walking/working surface to support employees safely.
- The project manager, superintendent, and foreman will select fall prevention and fall protection systems stated below upon confirming a fall protection system is required.
  - a. Fall Prevention Eliminate falls of six (6) ft. or greater, where feasible and applicable, during all phases of the specific work task by means of permanent or semi-permanent floors, walls, scaffolding platforms, guardrails, personnel lifts, etc.
  - b. Fall Protection System Selecting and installing a fall protection system to eliminate falls of six (6) ft. or greater by means of an approved personal fall protection system
  - c. When a fall prevention system cannot be utilized. The fall protection system may include, but is not limited to, all or part of the following:
    1. Body Harness
    2. Shock Absorbing Lanyard
      - Nonadjustable
      - Adjustable
    3. Positioning Lanyard
    4. Girder Grip with Shock-Absorbing Lanyard
    5. Rope Grab with 3 ft. Lanyard and 5/8" Synthetic Lifeline

6. Beam Tie-Off Adapter
  - 3 ft.
  - 6 ft.
7. Self-Retracting Lifeline
  - 11 ft.
  - 20 ft.
  - 50 ft. - with or without Retrieval Handle
8. Beamers
9. Anchor Slings
10. Horizontal Lifelines

The standard items referenced above are engineered for a maximum total weight capacity (i.e., weight plus tools, equipment, etc.) of 310 lbs. Customized equipment can be engineered to sustain higher capacities.

d. Retrieval Devices

1. Boom Platform/Scissors Lift
2. Suspended Work Platform/Basket
3. Self-Retracting Lifelines
4. Descent Type Controller
5. Ladders
6. Rescue/Fire Department
7. Tripod

- Every effort must be taken to minimize the potential of falls to individuals installing temporary or permanent fall protection systems. Equipment and materials used in fall protection is to meet the applicable ANSI and ASTM requirements.
- In the event an employee falls, or some other related incident occurs (i.e. a near miss), an investigation is to be completed by the Safety Department, Project Manager, and/or Superintendent. After the investigation, if the fall protection plan needs to be changed, changes will be implemented to prevent similar types of falls or incidents.
- A qualified person will verify that employees can be promptly rescued in the event of a fall through rescue equipment, training employees in rescue procedures, and contacting potential emergency responders and ensuring they can promptly rescue a fallen worker.

Training:

- Each employee who will be potentially exposed to a fall hazard is to be trained by a competent individual to recognize and eliminate or minimize hazards. The training is to address the prevention and protection systems available for use, recognition of fall hazards, and procedures to follow in minimizing these hazards.
- All training will be documented with the following:
  - a. Names of employees trained
  - b. Date of training
  - c. Name and/or signature of the person conducting the training
- The latest documentation of training is to be maintained and readily available for review.

Retraining:

- The retraining of employees is required when one of the following conditions exists:
  - a. Changes in the workplace render previous training obsolete.
  - b. Changes in types of fall protection systems or equipment to be used.
  - c. Employee(s) don't have the understanding and skill to use fall protection systems or equipment.



### User Responsibility:

- Each employee has the responsibility of thoroughly inspecting the personal fall protection system anchor point(s), connecting means (lanyard), and body harness prior to use. It is to be brought to the attention of the employee's immediate supervisor when any problems/defects are noticed with any equipment.
- Any questions concerning the type of personal fall protection system best suited for a particular job, as well as system installation, are to be directed to the Safety Department.

### General Requirements:

- Walking/working surfaces are to have the strength and structural integrity to support employees safely.
- Unprotected sides or edges which are six (6) ft. or more above a lower level are to be protected by guardrail systems or personal fall arrest systems.
- Leading edges six (6) ft. or more above lower levels are to be protected from falls by guardrails systems or personal fall arrest systems. The exception would be where these systems are infeasible in which case a fall protection plan would have to be developed (the Safety Dept. must be consulted to initiate such a plan).
- Holes [void or gap two (2) inches in its least dimension] are to be protected when there is a fall exposure of six (6) ft. or more to a lower level or there is an exposure to objects falling through the opening.
- Employees on the face of formwork or reinforcing steel are to be protected from falling six (6) ft. or more to a lower level.
- Ramps, runways, and other walkways are to be equipped with a guardrail system at heights of six (6) ft. and greater.
- Excavations six (6) ft. or more in height are to be protected from falls by guardrail systems, fences, or barricades when they are not readily seen due to an obstruction (e.g., plant growth, spoils, etc.). Edges of a well, pit, shaft, caissons, and similar excavations six (6) ft. or more in depth are to be protected from falling by guardrail system, fences, barricades, or covers.
- When exposed to a fall into or onto dangerous equipment, greater than six (6) ft., protection is to be provided by means of a guardrail system or personal fall arrest system. Depending on variables, fall exposures less than six (6) ft. may need to be protected by a guardrail system or equipment guard.
- The following pertains to roof work:
  - a. While working on low sloped roofs, employees exposed to unprotected sides and edges six (6) ft. or more above lower levels are to be protected by:
    1. Guardrail systems
    2. Personal fall arrest systems
    3. Combination of warning line system and guardrail, personal fall arrest system, or safety monitoring system.
    4. Safety monitoring systems can only be used on roofs 50 ft. or less in width.
  - b. While working on steep roofs, employees exposed to unprotected sides and edges six (6) ft. or more above lower levels are to be protected by:
    1. Guardrail systems
    2. Personal fall protection
- In the erection of precast concrete members and related operation (grouting), employees exposed to falls at six (6) ft. or greater are to be protected from falling by guardrail systems or personal fall arrest systems. The exception would be where these systems are infeasible in which case a fall protection plan would have to be developed.
- Wall openings that are less than 39 inches above the walking/working surface, and where the outside bottom edge of the wall opening is six (6) ft. or more above the lower level, are to be protected by the use of a guardrail system, cover, or personal fall arrest system.

- When purchasing fall protection equipment and related materials, the items are to meet ANSI and ASTM requirements.

### Protective Systems:

When purchasing fall protection equipment and materials to be used in fall protection systems, a qualified person will verify that they meet the applicable OSHA, ANSI, or ASTM requirements.

- Guardrail Systems:
  - a. Guardrails consist of a top edge member approximately 42 inches (plus or minus 3 inches) above walking/working surface.
  - b. Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members are required between the top edge of the guardrail system and walking/working surface when there is no wall or parapet wall at least 21 inches high.
  - c. Guardrail systems must withstand, without failure, a minimum force of 200 lbs. applied within 2 inches of the top edge of the top rail and midrail in any outward or downward direction. The top edge of the guardrail cannot deflect to a height less than 39 inches above the walking/working level.
  - d. Guardrail systems must be surfaced to prevent injuries from punctures, lacerations, or snagging of clothes. Ends of top and mid rails cannot overhang past the terminal post, except when it does not constitute a projection hazard. Steel and plastic banding, manila or synthetic rope cannot be used as top or mid rails.
  - e. Guardrail systems used at hoisting areas require a gate or removable guardrail section placed across the access opening when hoisting operations are not taking place. Guardrail systems used at hoist areas are to be erected on all unprotected sides or edges.
  - f. On guardrail systems around holes/openings used for the passage of materials, these cannot have more than two sides provided with removable guardrail sections. When not in use, it is to be protected with a cover or a guardrail system provided along all unprotected sides or edges.
  - g. Guardrail systems around holes used as points of access (ladder ways) are to be provided with a gate or offset so a person cannot walk directly into the hole.
  - h. When using wire rope, top rails and mid rails must be a minimum 3/8-inch nominal diameter or thickness. **Top rails are to be flagged with high-visibility material at intervals not exceeding 6 ft.**
  - i. Listed below are the requirements for various railings:
    1. Wood Railings Top rails are at least 2-inch by 4-inch lumber. Midrails are either of 1-inch by 6-inch or 2-inch by 4-inch lumber. Posts are at least 2-inch by 4-inch lumber spaced not more than 8 ft. apart on center.
    2. Pipe Railings Top rails and mid rails is at least one and one-half inches nominal diameter (schedule 40 pipe). Posts are at least one and one-half inches nominal diameter (schedule 40 pipe) spaced not more than eight (8) ft. apart on centers.
    3. Structural Steel Railings Top rails and mid rails are at least 2-inch by 2-inch by 3/8-inch or the equivalent steel angles. Posts are at least 2-inch by 2-inch by 3/8-inch or the equivalent steel angles spaced not more than 8 ft. apart on centers.
    4. Wire Rope Railings Top rails and mid rails are to be a minimum 3/8-inch diameter and smooth to prevent laceration or snagging of clothing. Deflection is not to exceed 3 inches in any direction. Ends of the wire rope are to be looped and secured with the appropriate amount of wire rope clips.
- Personal Fall Arrest Systems
  - a. Employees will be required to utilize body harnesses as part of the personal fall arrest system. Dee-rings must have a minimum tensile strength of 5,000 lbs.
  - b. Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 lbs.



Snap hooks are to be of the locking type and used only in conjunction with the body harness Dee-ring located in the center of the wearer's back near shoulder level.

- c. In the utilization of personal fall arrest devices, such as vertical lifelines, each employee is to be attached to a separate device, unless otherwise designed. Lifelines must be protected against being cut or worn.
- d. All personal fall arrest systems are to be used only for employee protection and not to hoist materials/equipment.
- e. Anchorages for attachment of personal fall arrest equipment must be:
  1. Capable of supporting a minimum of 5,000 lbs. per employee, or designed, installed, and used under the supervision of a qualified person as part of a complete personal fall arrest system which maintains a safety factor of at least two.
- f. Personal fall arrest systems when arresting a fall must:
  1. Limit maximum arresting force on an employee to 1,800 lbs. when used with a body harness.
  2. Be rigged so an employee cannot free fall more than 6 ft., nor contact any lower level.
  3. Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3 ft. 6 inches.
- g. Personal fall arrest systems and components subjected to impact loading will be removed from service and not used again until inspected and determined safe for use by a competent person.
- h. A means of retrieval/rescue is to be available in the event of a fall.
- i. Personal fall arrest systems may not be attached to any guardrail systems. When used in hoist areas, these must be rigged so a person can only go as far as the edge of the walking/working surface, eliminating the hazard.
- j. All equipment used in the personal fall arrest systems must be inspected prior to use for wear, damage, and other deterioration. Defective components must be tagged inoperable and immediately removed from service.

- Positioning Device Systems

- a. Positioning devices are to be rigged so an individual cannot fall more than two (2) ft. Attachment is to be made with two (2) Dee-rings at waist level.
- b. The anchorage point must be capable of supporting at least twice the potential impact load of an employee's fall, or 3,000 lbs., whichever is greater.
- c. Snap hooks are to be of the locking type.
- d. Positioning device systems must be inspected prior to use for wear, damage, and other deterioration. Defective components must be tagged inoperable and immediately removed from service.

- Warning Line Systems

- a. A warning line is a barrier erected on a roof to warn employees they are approaching an unprotected roof side or edge and designates an area where roofing work may take place without the use of a guardrail or personal fall arrest system.
- b. Warning line systems will comply with the following provisions:
  1. Erect warning lines around all sides of the roof work area.
  2. Warning lines are to be erected not less than 6 ft. from the edge during roofing activities. During non-roofing activities, the warning line system must remain 15 ft. from the edge.
  3. When mechanical equipment is being used during roofing activities, the warning line will be not less than 6 ft. from roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 ft. from the

roof edge perpendicular to the direction of mechanical equipment operation. This information would be included in the fall protection plan.

4. Points of access, material handling areas, storage areas, and hoisting areas are to be connected to the work area by an access path formed by two warning lines. When not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, is to be placed across the path at the point where the path intersects the warning line erected around work area, or the path is to be offset so a person cannot walk directly into the work area
  - c. Warning lines consist of:
    1. Rope, wire, or chain flagged at not more than 6 ft. intervals with high-visibility material.
    2. Lowest point is no less than 34 inches and highest point is no more than 39 inches from walking/working surface.
    3. Stanchions are to be capable of resisting, with lines attached, a force of at least 16 lbs. applied horizontally without tipping over.
    4. Rope, wire, or chain must have a tensile strength of at least 500 lbs.
    5. Lines attached at each stanchion are to be constructed so that pulling on one section of line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
  - d. Mechanical equipment on roofs is to be stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.
- Safety Monitoring System
    - a. Safety monitoring system means a safety system in which a competent person is responsible for recognizing and warning employees of a fall hazard.
    - b. The safety monitoring system is to be used when referenced in the Fall Protection Plan (see Fall Protection Plan section), and when no other system can be used.
    - c. The safety monitor will be responsible for the following:
      1. Able to recognize fall hazards.
      2. Warn employee when it appears employee is unaware of a fall hazard.
      3. Located on same surface within visual distance of employee being monitored.
      4. Be close enough to communicate verbally with employee.
      5. Will not have any other responsibilities which could take monitor's attention away from monitoring function.
    - d. Mechanical equipment is not to be used or stored in areas where the monitoring is being completed.
    - e. No employee other than those engaged in roofing or covered by the Fall Protection Plan will be allowed in the area being monitored.
  - Covers
    - a. Any hole (2 inches or greater in its least dimension) in a floor, roof, or other walking/working surface can be protected by a cover. The cover must be capable of supporting without failure at least twice the maximum intended load.
    - b. Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
    - c. All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed at any time.
    - d. Covers are to be secured to prevent accidental displacement.
    - e. Covers are to be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

- Protection from Falling Objects
  - a. Falling object protection is to comply with the following provisions:
    1. Toe boards, when used, are to be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below.
    2. Toe boards must be capable of withstanding, without failure, a force of at least 50 lbs. applied in downward or outward direction at any point.
    3. Toe boards are to be a minimum of 3-1/2 inches in vertical height with not more than 1/4 inch clearance above the walking/working surface.
    4. Be solid or have openings not over 1 inch in greatest dimension.
  - b. Tools, equipment, or materials piled higher than the top edge of a toe board require protection (screening) to be erected to the top of the top rail or midrail for a distance sufficient to protect employees below.
  - c. Guardrail systems used as falling object protection will have openings small enough to prevent passage of potential falling objects.
  - d. During the performance of overhand bricklaying and related work:
    1. No material or equipment except masonry and mortar will be stored within 4 ft. of the working edge.
    2. Excess mortar, broken or scattered masonry units, and other materials and debris are to be kept from work area by removal at regular intervals.
  - e. During the performance of roofing work:
    1. Materials and equipment are not to be stored within 6 feet of a roof edge unless guardrails are erected at the edge.
    2. Materials which are piled, grouped, or stacked near a roof edge are to be stable and self-supporting.
  - f. Canopies used as falling object protection are to be strong enough to prevent collapse and prevent penetration by any object which may fall onto the canopy.
  
- Fall Protection Plan
  - a. In the event it is infeasible or creates a greater hazard to use conventional fall protection equipment, a fall protection plan is to be developed by a qualified person.
  - b. The fall protection plan is to conform to the following:
    1. Developed specifically for the project where the work is being performed and kept up to date.
    2. A copy of the plan is to remain on the project.
  - c. Fall protection plans must:
    1. Have reason(s) why conventional fall protection systems are infeasible or why the use creates a greater hazard.
    2. Include written discussion of other measures taken to reduce or eliminate fall hazards for workers who cannot utilize conventional fall protection systems.
    3. Identify each location where conventional fall protection methods cannot be used. These locations are classified as controlled access zones (CAZ).
    4. Include a statement which provides the name of each employee designated to work in CAZ. No other employee may enter the CAZ.
  - d. A safety monitoring system is utilized when other measures cannot be implemented. Boldt will designate a competent person to monitor the safety of other employees. The safety monitor is to comply with the following requirements:
    1. Be competent to recognize fall hazards
    2. Warn employees when it appears the employee is unaware of a fall hazard or acting in an unsafe manner;
    3. Work on the same walking/working surface and within visual sights distance of the employee being monitored
    4. Stay close enough to communicate verbally with the employee

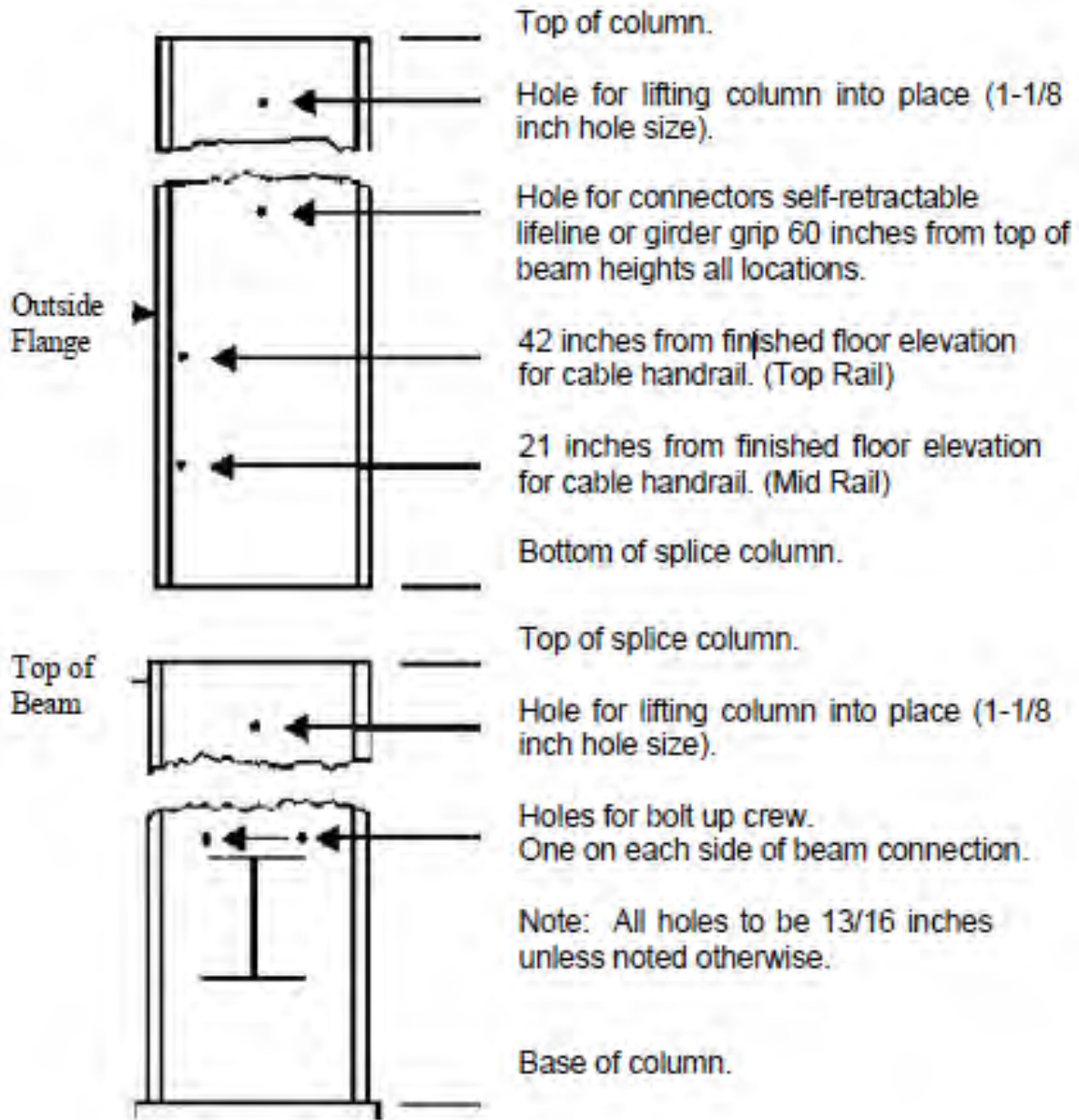
5. Not have any other responsibilities that could take the monitor's attention from the monitoring function.
- e. In the event an employee falls or there is a near miss, the incident is to be investigated and determined if the fall protection plan needs to be changed. The investigation is to be documented and changes implemented to prevent similar falls or incidents.
- f. A qualified person will supervise and/or approve any changes to the fall protection plan.

Pre-Job Planning for Steel Fabrication Fall Protection - Hole Location:

Columns:

- a. Splices no more than four (4) ft. above top of beam heights.
- b. Splice plates to be bolt connections with plates attached to bottom of top splice column.

c. Hole locations in web of column (Detail A):

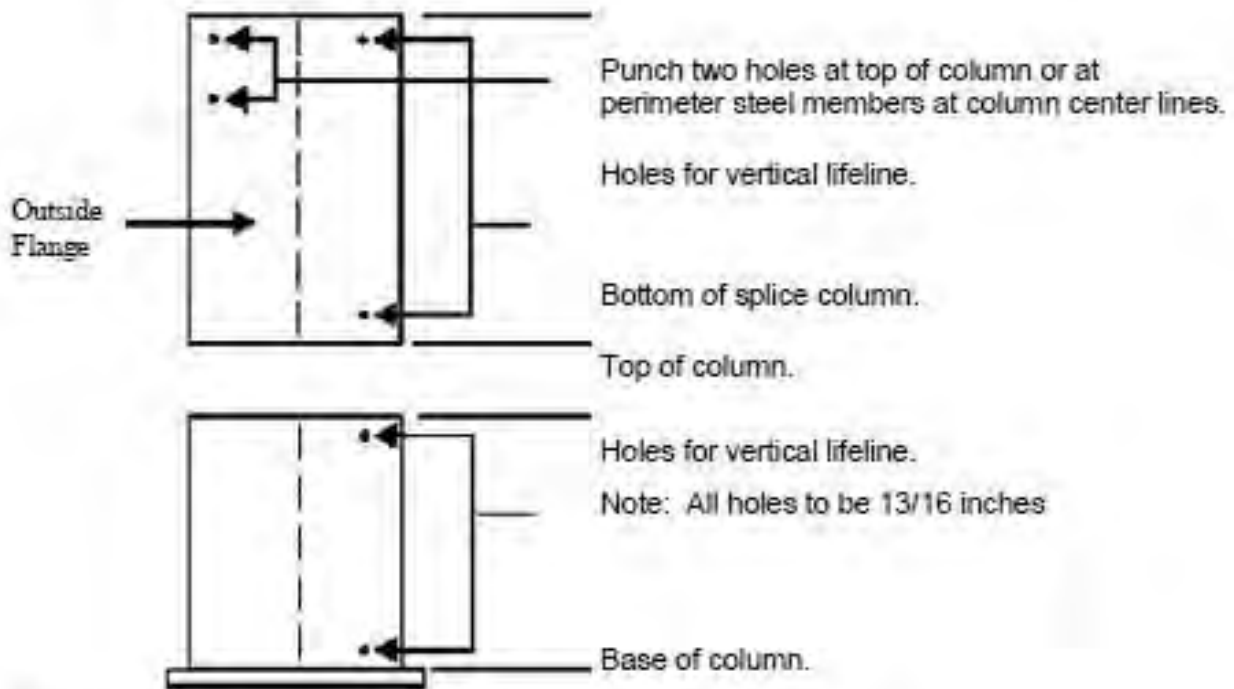


(Detail A)

Drawing not to scale

d. Hole locations in flange of columns (Detail B):

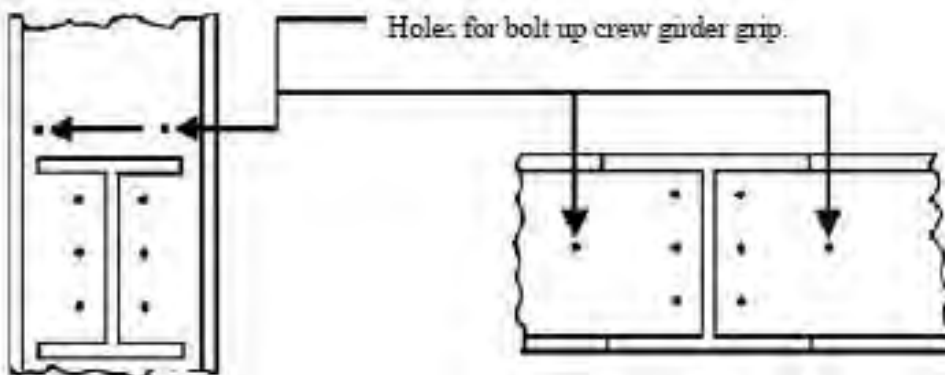
Top of column.



(Detail B) Drawing not to scale

• Beams:

- a. At all connection points (beams into beams or beams into columns) provide one extra hole off to each side for girder grip insert.



Beams into Columns Connections

Beams into Beams Connections

All extra holes shall be approved by the manufacturer and architect prior to fabrication!

*Work Task Procedures:*

- Steel Erection

- a. Connecting Work Task
  1. Use personnel lifts or vertical lifelines for accessing and leaving work areas.
  2. At connection area, tie off with the use of a girder grip and shock absorbing lanyard.
  3. Use retractable, lanyard with shock absorber, anchor sling, or horizontal lifelines when cutting the beam loose.
  4. Approved Equipment List:
    - Body Harness with built-in Self-Retractable Lifeline.
    - Girder Grip with Shock Absorbing Lanyard
    - Beam Tie-Off Adapter. Rope Grab with approved Vertical Lifeline
    - Beamer or Anchor Sling
    - Shock Absorbing Lanyard
- b. Detail/Bolt-up Work Task
  1. Use personnel lifts, vertical/horizontal lifelines, or temporary/permanent structures for accessing and leaving work areas.
  2. At detail/bolt-up area, tie off with the use of a girder grip if additional hole is present; if not, use beam tie-off adapter around structure, anchor sling around steel, beamer connected to flange with shock absorbing lanyard, or vertical/ horizontal lifelines.
  3. Approved Equipment List:
    - Body Harness
    - Girder Grip with Shock Absorbing Lanyard Shock Absorbing Lanyard
    - Beam Tie-Off Adapter
    - Rope Grab
    - Vertical/Horizontal Lifeline
    - Beamer or Anchor Sling
- c. Grating/Metal Deck Work Task
  1. Use personnel lifts or temporary/permanent structures for accessing and leaving work areas.
  2. Use the sliding cable system at the leading edge or self-retracting lifeline and perimeter protection (cables, guardrails, etc.).
  3. Where possible, the perimeter guardrail system is to be installed prior to or during the installation of the grating/metal deck.
  4. Approved Equipment List:
    - Body Harness
    - Shock Absorbing Lanyard
    - Self-Retracting Lifeline
    - Sliding Cable System
- Form Work
  - a. Use personnel lifts, protective equipment, and/or temporary/permanent structures for accessing and leaving work areas.
  - b. Two-lanyard system or a safety block with retractable lifeline is to be utilized when climbing/relocating on the forms.
  - c. Triangular scaffold brackets are to be installed with appropriate guardrails (top and midrail), toe boards, and tie-off cable as required.
  - d. Approved Equipment List:
    - Body Harness
    - Lanyard with either an approved twist lock safety hook or double action rebar safety hook that would attach to the formwork.
    - Self-Retracting Lifeline.

- Rebar Installation
  - a. Use personnel lifts, protective equipment, and/or temporary/permanent structures for accessing and leaving work areas.
  - b. Two-lanyard system or a self-retractable lifeline is to be utilized when climbing, tying rebar, and relocating on the vertical mat.
  - c. Approved Equipment List:
    - Body Harness
    - Positioning Lanyard and Shock Absorbing Lanyard
    - Self-Retractable Lifeline
- Precast Deck on Steel Structures
  - a. Use personnel lifts and/or temporary/permanent structures for accessing and leaving work areas.
  - b. Use the sliding cable system at the leading edge attached to perimeter cables and tie off to cables.
  - c. Approved Equipment List:
    - Body Harness
    - Shock Absorbing Lanyard
    - Self-Retracting Lifeline
    - Beamer or Anchor Sling
- Precast Structures
  - a. Connecting Work Task
    1. Use of personnel lifts, ladders, and/or snatch blocks with rope release system or vertical lifeline to erect columns, beams, and wall panels.
    2. In the placement of wall and floor panels, a self-retracting lifeline and/or a static line can be used.
    3. Approved Equipment List:
      - Body Harness with Self-Retracting Lifeline
      - Snatch Block with Rope Release System
      - Self-Retracting Lifeline
      - Shock Absorbing Lanyard
      - Rope Grab with Approved Lifeline
  - b. Detail Work Task
    1. Use of personnel lifts, ladders, and/or vertical/horizontal lifelines for accessing and leaving work areas.
    2. Use self-retracting lifelines and/or sliding cable system at the leading edge.
    3. Use existing precast lifting lugs to tie-off
    4. Standard guardrails are to be installed around floor holes/openings, open-sided floors, and wall openings less than 42 inches from floor elevation.
    5. Approved Equipment List:
      - Body Harness with Self-Retracting Lifeline
      - Self-Retracting Lifeline
      - Shock Absorbing Lanyard
- Machinery Erection/Rigging
  - a. Use personnel lifts, protective equipment, and/or temporary/permanent structures for access to and from work areas.
  - b. Use personnel lifts on tending side and small scissors lifts on drive side whenever possible.
  - c. Properly erect 1/2 inch diameter cable, including sag, every six (6) feet as each specific part of the machine is going up. Use this cable to tie-off to with shock absorbing lanyard.
  - d. At the base of the machine, use eye bolts attached to the machine track/sole plate as



tie-off points.

- e. When working on a specific item on the drive or tending side, use a shock absorbing lanyard and tie-off to area on machine (capable of withstanding 5,000 lbs).
- f. Approved Equipment List:
  - Body Harness
  - Shock Absorbing Lanyard
  - Self-Retracting Lifeline
- Scaffold Erection
  - a. All scaffolding shall comply with the Scaffold Safety Policy (Policies and Procedures).
- Ladder
  - a. Work tasks performed from ladders at heights of six (6) ft. or greater require fall protection. The exception is when the ladder is used specifically to get from one level to another.
  - b. Approved Equipment List:
    - Body Harness
    - Body Harness with Self-Retracting Lifeline
    - Shock Absorbing Lanyard
    - Rope Grab with Rope Lifeline (synthetic only) with double locking latch on each end
    - Self-Retracting Lifeline
- Tower Crane
  - a. Climbing the tower to conduct inspections, lubrication, etc.
    1. The individual is to utilize a rope grab and vertical lifeline to proceed up or down the tower of the crane.
    2. Two-lanyard system is to be used in climbing out on the boom.
    3. Approved Equipment List:
      - Body Harness
      - Rope Grab
      - Vertical Rope Lifeline (synthetic only) with double locking latch on each end.
      - Shock Absorbing Lanyards.
- Confined Space Entry
  - a. Follow guidelines outlined in the Confined Space Entry Program (Special Programs).
  - b. Approved Equipment List:
    - Body Harness
    - Mechanical Hoisting Device when entry is more than five (5) ft. deep (self-retracting lifeline with hand crank or tripod system).
    - Lifelines
    - Ladder

## DEFINITIONS

ANCHORAGE: A secure point of attachment for lifelines, lanyards, or deceleration devices.

ANCHOR SLING: A wire rope device for fall arrest purposes only. It is made of 1/4 inch galvanized aircraft cable with hardware on each end that permits usage in the choked position around structural steel or similar material meeting the necessary strength requirements for anchorages.

BEAMERS: A fall arrest device for use on "I" and "H" beams during steel building erection/construction. It comes in different sizes to accommodate different flanges widths and thickness. For more information on the beamer including limitations contact the Safety Department.

**BODY HARNESS:** Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall arrest system.

**BUCKLE:** Any device for holding the body belt or body harness closed around the employee's body.

**CONNECTOR:** A device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabineer, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

**CONTROLLED ACCESS ZONE (CAZ):** An area in which certain work may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

**DANGEROUS EQUIPMENT:** Equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

**EQUIVALENT:** Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials, or designs specified in Subpart M of 29 CFR.1926.

**FAILURE:** Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

**FREE FALL:** The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

**FREE FALL DISTANCE:** The vertical displacement of the fall arrest attachment point on the employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

**GIRDER GRIP:** A steel rod encased in a stainless steel barrel with an eye nut at one end (to which the lanyard or self-retracting lifeline is connected) and a pivoting wing-bar at the other (providing the girder lock).

**GUARDRAIL SYSTEM:** A barrier erected to prevent employees from falling to lower levels.

**HOLE:** A gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.

**INFEASIBLE:** It is impossible to perform the construction work using a conventional fall protection system (guardrail system or personal fall arrest system) or technologically impossible to use any one of these systems to provide fall protection.

**LANYARD:** A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

**LEADING EDGE:** The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and/or continuously under construction.

**LIFELINE:** A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

**LOW-SLOPE ROOF:** A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

**LOWER LEVELS:** Those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

**MECHANICAL EQUIPMENT:** All motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mop carts.

**OPENING:** A gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

**OVERHAND BRICKLAYING AND RELATED WORK:** The process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending the electrical installation incorporated into the brick wall during the overhand bricklaying process.

**PERSONAL FALL ARREST SYSTEM:** A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, body harness, and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.

**POSITIONING DEVICE SYSTEM:** A body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

**ROPE GRAB:** A deceleration device which travels on a lifeline and automatically by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

**ROOF:** The exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily becomes the top surface of a building.

**ROOFING WORK:** The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

**SAFETY MONITORING SYSTEM:** A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

**SELF-RETRACTING LIFELINE/LANYARD:** A deceleration device containing a drum-wound line which can be slowly extracted from or retracted onto the drum under slight tension during normal employee movement, and which after onset of a fall, automatically locks the drum and arrests the fall.

**SNAPHOOK**: A connector comprised of a hook-shaped member with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection.

**STEEP ROOF**: A roof having a slope greater than 4 in 12 (vertical to horizontal).

**TOEBOARD**: A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

**TRIPOD RETRIEVAL DEVICE**: Tripod with manual/machine operated winch system used in rescue-work support.

**UNPROTECTED SIDES AND EDGES**: Any side or edge (except at entrances to points of access) of a walking/working surface (floor, roof, ramp, or runway) where there is no wall or guardrail system at least 39 inches (1.0 m) high.

**WALKING/WORKING SURFACES**: Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork, concrete reinforcing steel, and ladders, but not including vehicles or trailers on which employees shall be located in order to perform their job duties.

**WARNING LINE SYSTEM**: A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrails, body harness, or safety net systems to protect employees in the area.

**WORK AREA**: That portion of a walking/working surface where job duties are being performed.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

## Fire Protection

### Purpose

Any fire in the workplace has the potential to cause serious personal or property damage. The best way to stop a fire is to eliminate the conditions that could create one. A fire needs heat, fuel, and oxygen. Preventing fires requires the removal of one of these elements. If chemicals are involved, the possibilities for destruction are greatly multiplied.

### General Requirements

Fire protection must be provided at each project. This will normally consist of a 20 lb. ABC extinguisher, although in certain circumstances carbon dioxide (CO<sub>2</sub>) or Halon may be needed. The use of soda-acid or carbon tetrachloride is prohibited. All extinguishers must be conspicuously located.

Each extinguisher will be subject to a monthly visual check by a designated The Boldt Company employee and inspected annually by a certified fire extinguisher inspection service, or when they have been discharged or damaged. Each extinguisher will have a durable tag, or equivalent, securely attached to show the maintenance test and recharge date.

A minimum of one 20 lb. ABC extinguisher must be located within 35 ft. of all hot work operations and/or heat-producing equipment. In addition, all combustibles must be removed from the immediate area or adequately covered to limit the potential of a fire. When hot work operations are such that normal fire prevention precautions are not sufficient, a fire watch is required and work must be completed a minimum of thirty minutes prior to the end of the work shift (see Hot Work under Policies and Procedures).

Fire extinguishers will be located in each job trailer and office trailer. A 20 lb. ABC extinguisher is required for each 3000 sq. ft. of building, with travel distance from any area not to exceed 100 ft. In addition, at least one extinguisher must be provided per floor, located adjacent to the stairway.

A minimum of one 5 lb. ABC extinguisher must be located in the cab and/or operator station of all cranes and any trucks over 10,000 lbs.

Emergency telephone numbers and alarm systems shall be established according to Boldt's Emergency Action Plan (Policies and Procedures).

Access to all firefighting equipment must be maintained at all times. No material can be stored in front of a fire extinguisher that may prohibit access/egress.

Walkways of 24 inches must be maintained for the path of travel to fire doors. Material must be cleared a minimum of 36 inches around fire doors/openings.

Material stored indoors must be placed at least 36 inches below sprinkler deflectors.

Housekeeping must be maintained on the jobsite so access to firefighting equipment and/or building exits is not limited. Oily rags must be kept in self-closing metal containers and emptied on a daily basis. Combustible materials stored outside cannot be piled higher than 20 ft.

Driveways between and around combustible storage piles located outdoors must be at least 15 ft. wide and kept free from accumulation of rubbish, weeds, and other unnecessary combustibles. Combustible materials cannot be stored within 10 ft. of a building or structure.

Outdoor/Yard storage areas must have fire extinguishers conspicuously located so that the maximum travel distance to the nearest unit does not exceed 100 ft.

Smoking is prohibited in areas of operation which may constitute a fire hazard, and needs to be identified by signage reading "NO SMOKING OR OPEN FLAMES". To limit potential of fire due to static electricity, filling gas cans on a pick-up bed is prohibited.

To prevent ignition hazards, electrical wiring and equipment will be installed in accordance with the National Electrical Code (NEC) and National Fire Protection Association (NFPA).

### **Flammable and Combustible Liquids**

Safety cans are to be utilized for the transfer and storage of flammable and combustible liquids. They must be equipped with fire baffles or flash screens that are approved and the cans must be properly labeled to identify the contents. Adequate ventilation must be used to minimize vapors. When using flammable/combustible liquid in excess of 5 gal., a fire extinguisher must be provided within 50 ft. When not in use, liquids must be in closed containers.

Storage tanks must be grounded and vented.

### Indoor Storage

In a building where there is a room used for the storage of flammable or combustible liquids in excess of 60 gal., there must be a 20 lb. ABC extinguisher stored not more than 10 ft. from the door.

In every inside storage room, there must be a 3 ft. wide clear aisle way. Containers over 30 gallons. Capacity cannot be stacked one upon the other.

Quantities of flammable/combustible liquids stored inside a building in excess of 25 gallons must be stored in an acceptable cabinet. Cabinets must be labeled "Flammable-Keep Fire Away". There cannot be more than 60 gallon of flammable, or 120 gallon of combustible liquids stored in an individual cabinet. In addition, not more than three cabinets can be stored in a single storage area. Outdoor Storage: At least one 20 lb. ABC extinguisher must be located at least 25 ft., but not more than 75 ft., from any outdoor flammable/combustible liquid storage area.

Storage tanks must have automatic shut off on dispensing hoses, without a latch-open device. Storage tanks must have some form of impact protection from vehicular traffic.

Areas used for storage of flammable and combustible liquids must be at least 20 ft. from buildings. Containers/Drums cannot exceed 1100 gallon in any one pile. Groups or piles of containers/drums shall be separated by a 5 ft. clearance.

Portable tanks, grouped together, having a combined capacity in excess of 2200 gallons must be separated by a 5 ft. clear area. Individual tanks in excess of 1100 gallons must also be separated by 5 ft. Within 200 ft. of each portable tank, there must be a 12 ft. wide access lane to allow the approach of fire-control equipment.

Areas used for fueling, servicing fuel systems, or dispensing flammable/combustible liquids must have signage conspicuously located prohibiting smoking.

Storage areas must be surrounded by a curb or earth dike at least 1 ft. high or otherwise graded to divert spills away from buildings or other exposures. Drainage must terminate at a safe location with provisions for draining off accumulations of rain water or spills of flammable/combustible liquids.

**Liquefied Petroleum Gases (Lpg)**

Containers must be upright and upon firm foundations or otherwise secured. When containers and regulating equipment are installed outside buildings or structures, special emphasis shall be made regarding settling. The outlet piping shall be guarded by a flexible connection or special fitting.

The storage of LPG within buildings is prohibited. The only time LPG can be kept inside is when it is "connected for use".

Storage locations must be provided with at least one 20 lb. ABC portable fire extinguisher. The storage of LPG awaiting use outside of buildings must be located from the nearest building in accordance with the following:

<b>Quantity Of LPG Stored (lbs.)</b>	<b>Distance (ft.)</b>
500 or less	0
501 to 6,000	10
6001 to 10,000	20
Over 10,000	25

Precautions must be taken to prevent vehicular damage to LPG systems or containers.

**Temporary Heating Devices**

Heaters must provide proper ventilation to ensure proper combustion and adequate amount of fresh air to maintain the health and safety of employees. Solid fuel salamanders are prohibited in buildings and on scaffolds.

Portable heaters must be equipped with an approved automatic device to shut off the flow of gas to the main burner, and pilot if used, in the event of flame failure.

Temporary heating devices must be located at least 6 ft. from any LPG container. Blower and radiant type heaters cannot be directed toward any LPG container within 20 ft.

Temporary heating devices must be installed to provide clearance to combustible material not less than the amount listed below unless lesser clearances have been formally established by the manufacturer.

**Minimum Clearance  
(inches)**

<b>Heater or Appliance</b>	<b>Sides</b>	<b>Rear</b>	<b>Chimney Con.</b>
Room heater, Circulating type	12	12	18
Room heater, radiant type	36	36	18

Heaters not suitable for use on combustible materials or floors can be placed on a suitable heat insulating material and must extend beyond the heater by 2 ft. in all directions.

Heaters must be placed at least 10 ft. from tarpaulins, canvas, or similar coverings. The coverings must be securely fastened to prevent ignition or movement of the heater if the covering(s) become displaced by the wind.

## **Training**

Employees will initially receive training on fire protection through safety orientation and safety meetings. Additional training is to be completed upon initial assignment and on an annual basis. Training will address the following areas:

Proper use of fire extinguishers and/or other fire protection equipment

Inspection of fire extinguishing equipment as well as location of equipment; Emergency procedures -- contacting authorities, supervisor, client, etc.

## **DEFINITIONS**

*BONDING*: The interconnection of two or more conductive objects.

*COMBUSTIBLE*: All items that will burn when heated and/or have flash points above 120° F (Fahrenheit).

*COMBUSTIBLE LIQUIDS*: Any liquid having a flash point at or above 140° F and below 200° F.

*FLAMMABLE*: Any agent capable of being easily ignited, burning intensely, or having a rapid rate of flame spread.

*FLAMMABLE LIQUIDS*: Any liquid having a flash point below 140° F and having a vapor pressure not exceeding forty pounds per square inch (absolute) at 100° F.

*FLASH POINT*: The minimum temperature at which a liquid gives off vapor in a sufficient concentration to ignite under normal circumstances.

*GROUNDING*: A specific form of bonding in which one or more conductive objects are interconnected to the ground.

*LIQUEFIED PETROLEUM GASES (LPG)*: Material which is composed predominately of hydrocarbons, or mixtures of them such as propane, propylene, butane, and butylene's.

*SAFETY CAN*: An approved closed container of not more than five gallons capacity, having a flash arresting screen, spring-closing lid, and spout cover designed to safely relieve internal pressure when subjected to fire exposure.



## FIRE EXTINGUISHER OPERATION

**P** Pull the pin on the extinguisher.

**A** Aim at the base of the fire.

**S** Squeeze the handle.

**S** Sweep at the base of the fire.

### Things to Remember:

1. Stand about 10 ft. from the fire.
2. Fire extinguishers last approximately 10 sec.
3. Be aware of smoke and fumes in the ambient (surrounding) air.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: September 1, 2007

## Fleet Safety

### Purpose

It is the intent of The Boldt Company to operate company owned or leased motor vehicles, equipment, and personal vehicles used on company business in the safest manner possible. We will only allow drivers who meet our hiring criteria to drive on company business and expect our drivers to comply with our safety policies and procedures and state law in order to do our part to make the roads as safe as possible.

This will outline The Boldt Company's commitment to, and expectations of, those who operate company owned vehicles, equipment, and personal vehicles used while conducting company business.

### Responsibilities

The Boldt Company will:

- Provide vehicles that meet federal/state mandated safety requirements.
- Require driving records at the time of hire for all drivers that will be assigned to operate company owned or leased vehicles and equipment on company business.
- Maintain a list of drivers authorized to operate company owned vehicles on company business.
- Support and enforce the Company Vehicle Use Policy.
- Check driving records for company employees who operate their personal or leased vehicles on company business, if requested to do so.

### Policies And Procedures

- Company owned or Leased Vehicles and Equipment (Note: reference to leased vehicles and equipment do not apply to rental cars or vans used on a temporary basis for employee travel or other approved temporary uses.)

### Driver List

All employees that will operate a company owned or leased vehicle and equipment on company business must be on the list of approved drivers. The list will indicate the driver's qualification status. The list will be maintained by The Boldt Company's Safety Department. Only drivers on the list may operate company owned or leased vehicles and equipment. Any changes in employee qualifications will be reported to The Boldt Company's Safety Department. All new drivers and new hires employed into positions which require driving a company owned or leased vehicle and/or equipment shall be forwarded to The Safety Department, who will then add the employee's name to the list of approved drivers.

### Driver Qualifications

Every driver on the driver's list must meet the point qualification for drivers as shown in Exhibit A., Driver Qualification Criteria. Traffic violations on or off the job will be counted against drivers for insurance and employment purposes. Drivers not meeting the qualification standard may be removed from positions requiring driving. Drivers removed from positions requiring driving may be reassigned accordingly.

### Safe Vehicle Operation

Drivers will operate vehicles and equipment in a safe and lawful manner and do what is reasonably expected to avoid fleet incidents/accidents and injuries to passengers.

### Vehicle Restraints

Drivers will ensure that all occupants of the vehicle wear seat belts at all times when the vehicle is in use. Passengers should not travel in vehicles that are not equipped with restraints in areas of the vehicle intended for cargo or where seats with restraints are not available.

### Vehicle Security

All vehicles should be locked when not in use. Vehicles should be parked in a secure location and valuables should be secured out of sight when the vehicle is not in use.

### Driving Records

Drivers are expected to maintain a driving record that allows them to meet the qualification criteria outlined in Exhibit A.

### Operating Vehicles While Impaired

Drivers shall not operate the vehicle/equipment while under the influence of drugs, alcohol or under any other conditions in which the driver's ability to operate the vehicle or equipment safely is inhibited or impaired. Employees who violate this policy will be subject to immediate disciplinary action, up to dismissal from employment.

### Vehicle Inspection

It is the responsibility of fleet users to perform routine pre and/or post inspections on vehicles and equipment. Inspection criteria may vary for each type of vehicle or equipment. The following are basic rules of thumb for inspecting vehicles and equipment that are recommended policies. At a minimum, all drivers of Boldt vehicles must complete the "Weekly Vehicle Inspection Form."

#### Pre-Trip Inspection

- Perform a visual walk around inspection of the vehicle for fluid leaks or obvious damage.
- Inspect the following fluid levels where appropriate.
- Engine oil
- Battery fluid levels
- Cooling system level
- Hydraulic oil
- Transmission fluid (after warm up)
- Inspect the engine compartment for loose/frayed belts, hoses, etc.
- Check tire pressure to stay within manufacturer's specifications.

Vehicles with defects that affect the vehicles' safety should not be driven until the vehicle is repaired.

### Vehicle Maintenance

The vehicles and equipment owned or leased by the company are on a preventative maintenance schedule based on miles or hours of operation. The operators of these vehicles are responsible to make sure proper preventative maintenance is completed in a timely fashion. Any repairs needed to ensure the safe operation of the vehicle/equipment shall be performed prior to the vehicle being used.

### Vehicle Operation

Drivers should operate the vehicles/equipment per the guidelines in the manufacturer's operating manual. Guidelines regarding not using cruise control in adverse weather must be followed. Drivers are expected to be familiar with a vehicle/equipment prior to using it and be able to operate lights, horn, emergency flashers and other equipment.

### Non Business Use

Drivers shall not permit the vehicle to be in custody or control of, or to be operated by, any person not authorized to operate a company owned or leased vehicle.

### Unauthorized Use

Employee agrees to indemnify and hold harmless The Boldt Company from and against any and all losses, costs, judgments, damages, claims or liabilities growing out of or resulting from any unauthorized use of a company owned or leased vehicle or from use of said vehicle by an unauthorized driver having care, control or custody of said vehicle.

### Temporary Drivers

Only approved Boldt employees, who have signed the Fleet Safety Acknowledgement form (Exhibit C), are allowed to drive a company vehicle. In addition, this policy allows Temporary Drivers, who are employed by Boldt and have a valid driver's license to operate a company vehicle. Temporary drivers are those who would use a vehicle on a random basis such as driving on an owner's property, driving off of the job to pick up supplies, delivering items or equipment to the main office, etc.

However, prior to the driver operating the vehicle, this policy should be discussed and a Temporary Driver Questionnaire must be completed and placed on file at the job site. The primary vehicle operator shall review the Temporary Driver Questionnaire and discretion should be used prior to allowing him/her to drive a company vehicle. (See Exhibit B)

### Fleet Incident/Accident/Vandalism Reporting

Drivers must report all fleet incidents/accidents/vandalism involving a company owned or leased vehicle or equipment to the Safety Department. Prompt reporting is essential to limit liability, and employees are expected to report all fleet incidents/accidents as soon as possible. (Report forms are located in all company vehicle glove compartments) A fleet incident/accident shall be defined as any damage incurred to a company owned or leased vehicle or equipment regardless of fault. This shall include collisions involving other vehicles and equipment, obstacles, pedestrians, animals, overturning, jackknifing, vandalism and other damage that is not considered normal wear and tear. Vandalism shall be defined as the act of maliciously damaging company owned or leased vehicles or equipment. Fleet incidents are those that would be considered minor due to the cost of repairs or that cause no damage to the company owned or leased vehicle/equipment, and minimal damage to property, obstacles, and animals.

All fleet incidents/accidents involving company owned or leased vehicles and equipment must be reported to the Safety Department immediately unless the employee is injured or unable to do so.

If an employee is involved in an accident, the following procedures apply:

- Call 911 and request EMS if anyone has been injured. Contact Safety Department.
- Wait for the emergency responders.
- Do not attempt to assist any injured parties except under the direction of a law enforcement officer or a medical responder unless conditions exist that will cause further injury or death if immediate actions are not taken (i.e. drowning, proximity to fire).
- Get the names, addresses, and phone numbers of all witnesses to the crash.

- Note the location, time of day, weather, and road conditions.
- Provide only your name, company name and company phone number to others involved in the crash.
- Answer any question asked by the responding law enforcement officer.
- Do not admit any guilt or liability.

#### Accident Investigation and Data Analysis

The Safety Department will review all fleet incidents, accidents, and vandalism involving company owned or leased vehicles/equipment, and report findings to prevent reoccurrence. When the facts are known, the Safety Department will determine the best strategy to prevent a reoccurrence of this type of fleet incident, accident, and/or vandalism. The findings are reviewed and recommendations are made to implement corrective action.

#### Claims Settlement

All incidents must be reported to the Safety Department, who will forward them to the Claims Manager. Claims Manager shall work with the insurance carrier on any further follow up information needed to settle claims. If the other party is at fault in a fleet incident, accident, or vandalism with a company owned or leased vehicle/equipment, then the Claims Manager will file a claim with the other party's insurance. The Boldt Company's insurance carrier can assist with this process.

#### Fleet Incident/Accident/Vandalism Review

Each fleet incident/accident/vandalism involving a company owned or leased vehicle/equipment will be reviewed by the Safety Department to determine if the driver did everything they reasonably could to avoid the accident. Each fleet incident/accident/vandalism will be classified as preventable or non-preventable. Fleet incident/accident/ vandalism preventability will be used in determining a driver's qualification to operate company owned or leased vehicles and equipment.

#### Motor Vehicle Records

The Boldt Company employees must exercise the utmost care in the use of company owned/leased vehicles/equipment to minimize damage. In order to reinforce the importance of individual responsibility for complying with this policy and preventing accidents, the policy requires that corrective action be taken against drivers who exceed the point totals in the Driver Qualification Criteria found in Exhibit A. The Safety Department will, when records are available, review all written and photographic information that is relevant to an accident and review the driving records of the employee(s) involved in an accident for the preceding 36 months. Next, there will be a review of the Driver Qualification Criteria and a levy of any corrective action based on the information gathered.

Any changes in an employee's point total will be updated in the Driver Qualification listing for insurance purposes.

An at-fault fleet incident/accident within the last three years will revoke an employee's excellent driving status and is grounds for corrective action. Depending on the circumstances surrounding each fleet incident/accident, the following corrective actions are possible.

- Oral Counseling
- Driver training
- Driver Education
- Written reprimand
- Suspension
- Probation
- Termination

A conviction for one of the following violations, barring appeal, will disqualify a driver from being considered for positions that require operation of company owned or leased vehicles/equipment.

- Driving under the influence of alcohol or a controlled substance.
- Refusing to submit to a test to determine alcohol or controlled substance concentration.
- Leaving the scene of an accident.
- Vehicular manslaughter/homicide.
- Using vehicle to commit a felony.
- Losing your license or driving while license is suspended.

Drivers with 12 points or more in a single year will be removed from positions requiring operation of company owned or leased vehicles/equipment. Drivers removed from positions requiring driving may be reassigned according to specific jobsite needs or for currently available positions that do not require driving. In a case of an arrest for a violation listed above, the Project Manager, with guidance from the Safety Department, may take appropriate action, up to and including dismissal from employment.

#### Employees Right of Appeal

An employee may appeal a disqualification not based on items 3, 4, or 5, above, to the Safety Department provided that such employee has not been arrested or charged with a violation carrying a point factor rating of 4 or higher (see Exhibit A) in the 12-month period preceding the date of the appeal hearing. The Safety Department may, at its discretion, after due consideration of the company's best interests, consider lifting the disqualification or restricting an employee's vehicle or equipment operation in lieu of permanent disqualification.

#### Post Fleet Incident/Accident Training

Drivers with violations, fleet incidents and/or accidents may be required to complete safety or fleet safety program training.

#### Program Acknowledgement

Drivers will read and sign the Vehicle Use Policy upon receiving a company owned or leased vehicle. Drivers will return the signed Vehicle Use Driver Acknowledgement Form to the Safety Department.

#### Personal Vehicles Used on The Boldt Company's Business

##### Safe Vehicle Operation

Drivers operating personal vehicles used on company business and drivers operating other non-company owned vehicles (rental cars) on company business will operate the vehicles in a safe and lawful manner and do what is reasonably expected to avoid crashes and injuries to passengers.

##### Vehicle Age and Condition

Vehicles should be in good mechanical condition and be maintained according to the manufacturer's standards. Vehicles that have mechanical defects or do not have a good appearance due to age, damage, rust, etc., should not be used on company business. Supervisors should change driving assignments when there is a clear indication that an employee's vehicle may be unsafe.

##### Insurance Limits

It is recommended that all vehicles that will be used on company business carry at least a \$300,000 Combined Single Limit (CSL) insurance policy.

### Verification of Coverage

Employees operating their own vehicles on company business must be able to provide proof of insurance in case of a traffic violation or accident.

### MVR Criteria

Employees should meet the same MVR criteria as company owned vehicle drivers as outlined in Exhibit A of the program.

### Passengers while on Company Business

It is recommended that no non-business passengers should be in the vehicle when the vehicle is being used on company business.

### Seat Belts

Drivers should ensure that all occupants of the vehicle wear seat belts at all times when the vehicle is in use. Business passengers should not travel in vehicles that are not equipped with restraints in areas of the vehicle intended for cargo or where seats with restraints are not available.

## Exhibit A – Driver Qualification Criteria

### Driver Qualification Criteria

All preventable fleet incidents/crashes within a 12-month period shall be subject to the following disciplinary action:

Driver will be categorized based on their point summation from the table within a 12-month period.

Excellent	0 points	Receive recognition
Satisfactory	1-4 points	Receive corrective action.
Unsatisfactory	5-11 points	Receive continued corrective action, and may include some type of driver improvement training.
Excluded Drivers	12+ points	Driver will not drive a company owned or leased vehicle or equipment. Drivers removed from positions requiring driving may be reassigned accordingly.

**Point Assessment Table:**

Driving under the influence of alcohol or a controlled substance	12 points
Refusing to submit to a test for alcohol or a controlled substance	12 points
Leaving the scene of a crash	12 points
Vehicular manslaughter/homicide	12 points
Using vehicle to commit a felony	12 points
Losing your license or driving while license is suspended	12 points
Reckless driving	6 points
Negligent crash	6 points
Violation with a pedestrian	6 points
Improper turn	4 points
Failure to control vehicle	4 points
Driving in an improper lane or on wrong side of road	4 points
Illegal passing	4 points
Failure to report a fleet incident, crash, or vandalism	4 points
Speeding	3 points
Violation in a school zone or yielding to a school bus	3 points
Failure to yield	3 points
Running a stop sign	3 points
Following a vehicle too closely	3 points
Unsafe backing	3 points
Rear-ending a vehicle, with no injury	3 points
Running over object causing damage to vehicle and/or property	3 points
Causing property damage operating on unstable surface/steep slope	3 points
Not being aware of your surroundings	3 points
Improper operation of a vehicle/equipment and causing damage	3 points
Flailing rocks when it is preventable	3 points
Not securing a load properly, including securing a trailer	3 points
Not following a proper procedure or accepted practice	3 points

All facts and circumstances surrounding the fleet incident/crash shall be reviewed prior to any corrective action being levied. Fleet incidents, as in those with no property damage or minimal costs, can have their point assessment adjusted down by up to two points only after reviewing the facts. The above point system is the minimum criteria for assignment of points.





FLEET POLICY

Temporary Driver Questionnaire

Temporary Drivers Name (Print)

Do you have a valid driver's license? Yes No

Driver's License Number

State in which license was issued

Date of Birth

Have you had any citations or accidents in the past 36 months? Yes No

If yes, please list below:

Three horizontal lines for listing citations or accidents.

By signing below, I, the temporary driver, am acknowledging that the above information is true and accurately represents my driving record. I understand and agree that any misrepresentation or omission of material fact on this questionnaire will constitute sufficient grounds for disciplinary action, up to and including termination. I also authorize The Boldt Company, at their discretion, to obtain a copy of my driving record.

I have read and fully understand the above:

Signature

Date

THE BOLDT COMPANY DISTRACTED DRIVING POLICY

In order to increase employee safety and eliminate unnecessary risks, The Boldt Company has developed a Distracted Driving Policy. We are committed to the safety of our employees and the general public, and while any distraction should be avoided while driving we have created the following rules to guide your use of electronic devices:

- Company employees may not read or respond to text messages, email, tweets or similar messages while operating a vehicle.
Other distractions that should be avoided while operating a vehicle include: looking up or keying in phone numbers, web surfing, setting up a GPS or using any electronic device other than in a hands free mode.
Phone calls are strongly discouraged, but if a call is required it should be completed with your hands free. If voice activated calling is not available we recommend the call be set up while parked in a safe location.
This policy applies to all employees when any of the following conditions apply:
- Operating a company vehicle
- Operating a personal vehicle on company business
- Operating a vehicle rented or leased for company business
- Driving on company property
- Using a cell phone supplied by the company for any calls
- Using a personal phone for company business
- Operating construction equipment including cranes, scissor and aerial lifts, forklifts, earthmoving, hauling and excavating equipment. Radio use is allowed when radios are the primary means of controlling the operation of the equipment.
All drivers must always comply with any applicable laws concerning distracted driving.

## Exhibit C

# VEHICLE USE DRIVER ACKNOWLEDGEMENT FORM

I have read this policy and appendices and understand my responsibilities to be a company owned or leased vehicle/equipment operator.

I agree to comply with the policy and understand that failure to comply may result in disciplinary action up to and including termination.

I hereby authorize The Boldt Company, at their discretion, to obtain a copy of my driving record and may use the driving record to qualify me as a driver of a company owned or leased vehicle used on company business as indicated above.

NAME (please print): \_\_\_\_\_

DRIVER'S LICENSE #: \_\_\_\_\_

STATE: \_\_\_\_\_

DATE OF BIRTH: \_\_\_\_\_

SIGNED: \_\_\_\_\_

DATE: \_\_\_\_\_

The signed copy of this program will become part of your personnel file.

### **THE BOLDT COMPANY DISTRACTED DRIVING POLICY**

In order to increase employee safety and eliminate unnecessary risks, The Boldt Company has developed a Distracted Driving Policy. We are committed to the safety of our employees and the general public, and while any distraction should be avoided while driving we have created the following rules to guide your use of electronic devices:

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- Phone calls are strongly discouraged, but if a call is required it should be completed with your hands free. If voice activated calling is not available, we recommend the call be set up while parked in a safe location.
- This policy applies to all employees when **any** of the following conditions apply:
  - Operating a company vehicle
  - Operating a personal vehicle on company business
  - Operating a vehicle rented or leased for company business
  - Driving on company property
  - Using a cell phone supplied by the company for any calls
  - Using a personal phone for company business
  - Operating construction equipment including cranes, scissor and aerial lifts, forktrucks, earthmoving, hauling and excavating equipment. *Radio use is allowed when radios are the primary means of controlling the operation of the equipment.*
- All drivers must always comply with any applicable laws concerning distracted driving.

## Ground-Fault Protection

The purpose of this procedure is to provide company policy and guidelines to eliminate all serious injuries resulting from possible malfunctions, improper grounding, and/or defective electrical powered tools, equipment, cord sets, receptacles, and other electrical appliances connected with the above.

### Daily Visual Inspection

A daily visual inspection must be made of the following to determine any external defects or indications of internal damage prior to use: cord sets, attachment cap, plug and receptacle of cord sets, and any other equipment connected by cord and plug (with the exception of cord sets and receptacles which are fixed and not exposed to damage) such as deformed or missing pins, crushed or damaged plugs, and/or insulation damage. Equipment found to be damaged must be tagged "Do Not Use" and removed from service until repaired and tested.

### Ground Fault Circuit Interrupters

All 120 volt, single-phase, 15 and 20 ampere receptacle outlets which are not part of the permanent wiring of the building or structure must have approved ground fault circuit interrupters for personnel protection. Work areas which contain water or moisture must be provided with ground fault protection.

(\*\*Michigan requires usage of 100% ground fault protection.)

### Assured Equipment Grounding Conductor Program

The following tests must be conducted at intervals not to exceed three (3) months on all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and any company-owned cord and plug-connected equipment required to be grounded.

- Grounding conductors must be tested for continuity and be electrically continuous.
- Each receptacle and attachment cap or plug must be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor must be connected to its proper terminal. The above required tests shall be performed before first use, before equipment is returned to service following repairs, or before equipment is used after any incident which can be reasonably suspected to have caused damage (e.g., when cord is run over or crushed).
- The above requirements must be adhered to prior to the use of any equipment by employees.
- Tests performed as required in this program must then be color coded. The color code will identify each receptacle, cord set, and cord and plug-connected equipment that passed the tests and indicates the appropriate calendar quarter for which it was tested.

### Employee Training

Employees assigned with the testing requirements of the program must be properly instructed regarding use of all testing equipment, nature of the hazards, and precautions to be taken.

## Color Code By Quarter

<u>Quarter</u>	<u>Color</u>
January 1 to March 31... ..	White
April 1 to June 30... ..	Green
July 1 to September 30 ... ..	Red
October 1 to December 31... ..	Orange

Identification must be by the appropriate colored tape which will adhere to the Cord set and cord and plug-connected equipment.

Colors are to be located on the cord set and equipment as follows:

- Cord sets - next to each end of the set.
- Cord and plug-connected equipment - on the cord adjacent to the base of the equipment.

*NOTE:* At the beginning of a new quarter, after appropriate tests and checks, the preference would be to remove tape prior to affixing the new color.

## Quarterly Notification To Employees

All cord sets and cord and plug-connected equipment must have this color identification on it. If not properly identified by color, it must be removed, tested, and properly identified prior to use. Privately- owned cords and equipment cannot be used on Boldt projects prior to testing and proper identification.

Daily Equipment Grounding Inspection and Maintenance Checklist:

- Power, portable, and/or cord and plug-connected equipment properly grounded or of double insulated type.
- Damaged tools or cord sets tagged "Do Not Use" and/or removed from service.
- Extension cords, three-wire type, in good condition (no worn or frayed parts or missing pins).
- Switches, circuit breakers, and disconnecting means legibly marked in circuit panel or temporary service.
- Temporary lights must be placed on their own circuit and equipped with heavy duty electric cords, nonconductive guards, or grounded parts.
- Suspended temporary lights designed for suspension cannot be suspended by their electric cords, fastened with staples, hung by nails, or suspended by wire.
- Cables or cords passing through work areas must be elevated or protected from damage.
- Outlet boxes properly covered.
- Receptacles for attachment plugs of the approved concealed type.
- Where different voltages, frequency, or types of current are supplied, receptacles must be of such design that attachment plugs are not interchangeable. Cords also marked.
- Disconnecting means for motors and appliances and each service feeder or branch circuit at the point where it originates legibly marked to indicate its purpose, unless located and arranged so that the purpose is evident.
- Noncurrent carrying metal parts of fixed, portable, and plug-connected equipment grounded. (Double insulated portable tools and appliances need not be grounded.).
- Exposed bulbs on temporary lights guarded to prevent accidental contact except where bulbs are deeply recessed in the reflector. Damaged or missing bulbs replaced.
- Employees' personal equipment and cords must be checked, tagged, and color coded quarterly.

## Hand and Power Tools

Hand and power tools must be maintained in a safe working condition. The use of unsafe tools is prohibited. Always use the correct tool for the job and know the correct use of each tool. Pay particular attention to the condition of each tool. Any tool that has significant signs of damage or is not functioning properly, must be tagged “Do Not Use” and be taken out of service until repaired by a qualified person. Be aware of all the potential hazards with the tool and within the operating area and be sure to utilize all necessary PPE prior to the start of any hand or power tool operation.

### Hand Tools

- Inspect hand tools before each use. Look for signs of wear including: cracks, loose components, mushroom heads, sprung jaws, chipped edges, dull blades, etc.
- Use the right tool for the job. (Example: do not use a screwdriver for a chisel)
- If the tool requires a blade, the blade needs to be sharp and in good condition. Dull blades can be more hazardous than sharp blades.
- The appropriate PPE (safety glasses, gloves, etc.) shall be worn to protect against hazards associated with tool operation.
- Body positioning is critical to hand tool safety. Good footing must be maintained to prevent the body from slipping and causing sprain/strain injuries. Anticipate what would happen if the tool slips or you lose your grip (example: a wrench slips off of a bolt running the employee’s hand into a pipe causing a contusion).

### Power Tools – Precautions

- Employees shall be trained in the use of all tools to understand the potential hazards and safety precautions to prevent hazards from occurring.
- Approved personal protective equipment must be worn when the type of work being performed warrants its use.
- Never carry a tool by the cord or hose.
- Never yank the cord or hose to disconnect it.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Disconnect the tool from the power source when not in use, before servicing, or before changing accessories such as blades, bits, and cutters.
- All observers shall be kept at a safe distance away from the operation.
- Secure the work with clamps, a vise, or another employee to free both hands to operate the tool. If the tool is designed for two hands to operate, two hands must be used to operate the tool.
- Avoid accidental starting. The worker shall not hold a finger on the switch button while carrying a plugged in tool.
- Never lay the power tool down until the accessory has come to a complete stop.
- Do not run the power tool while carrying it at your side.
- Tools shall be maintained with care. Tools shall be kept sharp and clean for the best performance.
- Do not overreach. Be sure to keep a good footing and maintain good balance when operating tools.
- The proper apparel shall be worn. Loose clothing, draw strings, or jewelry can become caught in moving parts.

- All tools that are damaged shall be immediately removed from service and tagged “Do Not Use.”

### **Power Tools – Electrical**

- Only power tools with good ground circuits, as indicated by Boldt’s Assured Grounding Program coloring system, are to be used.
- Double insulating power tools are acceptable if they are in good condition.
- All extension and power tool cords must have rubber insulation and be graded for construction use.
- Only qualified personnel can make repairs to electrical power cords.
- Power cords shall be inspected for use.

### **Power Tools – Guards and Handles**

- When power tools are designed to accommodate guards and handles, they must be properly equipped and used with such guards and handles in place. Any deviation must be approved of by the foreman with a written plan to provide the maximum protection.
- Keep handles dry, clean, and free from oils for better tool security when operating.
- Hold the power tool by the insulated gripping surfaces when performing an operation where the cutting accessory may come into contact with hidden wiring or its own cord.

### **Power Tools – Abrasive Wheel Tool**

- Before an abrasive wheel is mounted, it shall be inspected closely and sound/ring tested to be sure the wheel is free from cracks or defects.
- To test, wheels shall be tapped gently with a light non-metallic instrument. If they sound cracked or dead, they could fly apart in operation and must not be used. A sound and undamaged wheel will give a clear tone or ring.
- To prevent the wheel from cracking, the user shall be sure the wheel fits freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place without distorting the flange.
- All guards must be in place to protect the user from flying fragments in case the wheel breaks.

### **Power Tools – Kickback and Related Warnings**

- Maintain a firm grip on the power tool and position your body and arm to allow you to resist kickback forces.
- Always use the auxiliary handle, if provided, for maximum control over kickback or torque reaction during start-up.
- Never place your hand near the rotating accessory.
- Never position your body in the area where the power tool will move if kickback occurs.
- Use special care when working corners, sharp edges, etc.
- Avoid bouncing and snagging the accessory.
- Do not force the power tool. Use the correct tool for your application.
- Do not position your body in line with and behind the rotating wheel.
- Never attempt to remove a cut-off wheel from the cut while the wheel is in motion, otherwise kickback may occur.
- Do not restart the cutting operation in the work piece. Let the wheel reach full speed and carefully reenter the cut.

### **Pneumatic Tools**

- The user must check to see that the tool is fastened securely to the hose to prevent them from becoming disconnected.
- A safety clip or retainer must be used to prevent such possible disconnection.
- The manufacturer's suggested safe operating pressure shall not be exceeded.
- Compressed air guns shall never be pointed toward anyone.

### **Gas or LP Operated Tools**

- Before refueling a gas or LP operated tool, shut the tool off and allow it to cool down.
- Fuel must be handled and stored in approved containers designed for that use.
- Be aware of enclosed spaces and/or areas without much air movement and the hazards of carbon monoxide and other toxic gases.

### **Woodworking Tools**

- A properly working magnetic switch is required which prevents automatic start-up in the event of a power failure.

**Remember -- Always wear eye protection (safety glasses with side shields, at a minimum)!**



Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: October 3, 2005

## Hearing Conservation Program

### Administration

It is the policy of The Boldt Company to implement an occupational hearing conservation program for our workers who are exposed to sound levels greater than 85 dbA on an 8 hour time-weighted average to prevent any temporary or permanent noise-induced hearing loss and to comply with the federal OSHA standard.

This written hearing conservation plan serves as a record of the details of the hearing conservation program in place at this company. We have this program in place to protect the hearing of all workers in the company. Elements of the hearing conservation program include:

- Monitoring
- Hearing Protection
- Training and Information
- Recordkeeping

### Monitoring

The monitoring program is in place to provide an ongoing means of determining employee exposure to noise and protect employees based on excessive exposure (Exhibit A - Noise Survey Record).

When information indicates that any employee's exposure may equal or exceed an hour time-weighted average of 85 decibels, the company develops and implements an appropriate monitoring program to identify all employees for inclusion in the hearing conservation program and to select proper hearing protection.

To determine employee exposure to noise, the following type of calibrated equipment is utilized:

- Sound level meter
- Dosimeter

The company notifies employees of the results of monitoring when exposed at or above an 8-hour time-weighted average of 85 decibels and the proper protocol to minimize and/or eliminate the noise exposure.

The company provides an opportunity for affected employees or their representatives to observe any noise measurements as they're conducted. Depending on the situation or the variables relating to the project, the company selects the proper hearing devices for affected employees.

Monitoring is completed whenever there's a significant change in:

- Production
- Process
- Equipment
- When regular controls increase noise exposures to the extent that either additional employees may be exposed at or above the action level or the attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of noise reduction.



## **Hearing Protection**

The company makes hearing protection available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees.

The company ensures use of available hearing protection by affected employees based on the equipment they'll be utilizing and their related job tasks.

The company ensures that employees have a variety of suitable protectors evaluated that attenuate (lower) employee exposure at least to an 8-hour time-weighted average of 90 decibels within the worksite specific noise environments.

The company has the following varieties of suitable hearing protection for employees to choose from:

- Multiple varieties or selections of earplugs
- Earmuffs

The company reevaluates attenuation whenever employee noise exposures increase to the extent that current hearing protectors won't provide adequate attenuation. In this case, engineering controls would be utilized as a first option; otherwise administrative controls such as rotating employees would be incorporated. If an employee must work in an area, double hearing protection may be used for the durations allowable as long as it's providing the necessary protection for the exposure.

## **Training And Information**

The Boldt Company has an annual hearing protection training program for all employees exposed to noise at or above an 8-hour time-weighted average of 85 decibels. The company ensures employee awareness and their participation in the hearing protection program during an initial orientation process and/or when specific equipment and/or tasks are used/performed that the company has deemed, requires hearing protection.

The company, periodically, repeats the training to make all employees aware of the potential noise hazard. The company assures that the training material is updated to be consistent with changes in the protective equipment and the work processes.

The training, at a minimum would consist of:

- The effects of noise on hearing
- The purpose of hearing protection, the advantages/disadvantages including limitations, and attenuation of various types, and instructions on selection, fitting, use, and care. The company makes informational materials pertaining to the Occupational Noise Exposure standard, supplied by OSHA, available to any affected employees or their representatives upon request.

**Recordkeeping**

Recordkeeping is an essential element of the hearing conservation program, since it is the means by which hearing levels are tracked and assessed over a period of time. The company has in place a series of measures to maintain comprehensive and up-to-date records.

The company maintains accurate records of employee exposure measurements, noise exposure measurement records and annual training records. Noise exposure records are maintained, at a minimum of two years, to determine patterns of changes in processes that may provide better information and a more comprehensive hearing conservation program.

Boldt provides access of records to current/former employees, representatives designated by the individual employee, and OSHA, upon written request.





## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 18, 2001

## Hot Work

### General Requirements

Prior to granting any authorized cutting or welding, the area must be inspected by the superintendent and/or foreman in charge of the operation. Precautions taken would be documented by a written permit. Hot work that is performed in a confined space must meet the criteria of Boldt's Confined Space Program. The training must cover specifics related to the hot work and the confined space to be entered to perform work.

Any welding, cutting, or burning of lead base metals, zinc, cadmium, mercury, beryllium, or exotic metals or any paint material with the above must have proper ventilation and/or respiratory protection.

First aid kit(s) must be onsite, available at all times. Arc and oxygen-fuel cutters and welders are to inspect all equipment prior to use. They are to report any and all equipment defects or safety hazards and discontinue use of equipment until repairs are made by a qualified person.

### Fire Protection and Prevention:

- A 20 lb. ABC fire extinguisher must be located within 35 ft. of any welding, cutting, grinding, soldering, brazing, burning, or other heat producing operations. All combustible or flammable materials must be removed or protected.
- In the event the object to be welded or cut cannot be moved, all other fire hazards are to be removed. If the fire hazards cannot be relocated, then guards, or equivalent protection, are to be used to confine the heat, sparks, slag, and to protect the immovable fire hazards. If neither one can be performed, the welding/cutting operation is not to be performed.
- When hot work operations are such that normal fire prevention precautions are not sufficient, a fire watch is required while work is being performed. Hot work operations must be completed a minimum of thirty minutes prior to the end of the work shift to insure that no possibility of fire exists.
- Any hot work operations to be performed in atmospheres containing combustible, flammable, or explosive dusts, gases, mists, fumes, or vapors must comply with confined space entry procedures, including atmospheric testing.
- A system for controlling/distributing "hot work permits" (Exhibit A and B) must be established where necessary or at the request of an owner.

### Personal Protective Equipment:

- Eye protection and face shields with tinted filter lenses, appropriate to the work, will be provided and must be used by all employees involved with welding, cutting, and burning operations.

- Filter lens shade numbers for protection:

<u>Operation</u>	<u>Shade #</u>
○ Shielded metal arc welding 1/16-,3/32-,1/8-,5/32-inch electrodes	10
○ Gas-shielded arc welding (nonferrous) ○ 1/16-,3/32-,1/8-,5/32-inch electrodes	11
○ Gas-shielded arc welding (ferrous) 1/16-,3/32-,1/8-,5/32-inch electrodes	12
○ Shielded metal-arc welding 3/16-,7/32-,1/4-inch electrodes	12
○ Shielded metal-arc welding 5/16-,3/8-inch electrodes	14
○ Atomic hydrogen welding	10-14
○ Carbon-arc welding	14
○ Soldering	2
○ Torch Brazing	3-4
○ Light cutting, up to 1 inch	3-4
○ Medium cutting, 1 inch to 6 inches	4-5
○ Heavy cutting, 1 inch to 6 inches	5-6
○ Gas Welding (light), up to 1/8 inch	4-5
○ Gas Welding (medium), 1/8 inch to 1/2 inch	5-6
○ Gas Welding (heavy), over 1/2 inch	6-8
○ Grinding Operations	1-2

- Welders must wear welding hoods attached to hard hats at all times. The only exception is when performed in a fabrication area designated by management that accounts for overhead hazards. These must be eliminated to protect workers using hoods without the protection of a hard hat. This exception is provided for situations where extensive hot work operations occur and therefore minimizing other potential hazards that may incur as a result of these functions.
- Flame-resistant aprons, coats, and gloves must be worn as protection against radiated heat and sparks as needed. All clothing must be free of oil and grease. All pockets and cuffs must be protected to prevent sparks from entering. Pants must be left over tops of boots, not tucked in.
- Noncombustible screens, shields, or other safeguards must be provided for the protection of employees and materials exposed to harmful rays, sparks, and falling or flying objects created by hot work operations.

Ventilation/Respiratory Protection:

- Normal welding, cutting, and burning operations with adequate ventilation may be done without mechanical or respiratory protection. Because of unusual physical or environmental conditions, an unsafe accumulation of contaminants may exist thus requiring respiratory protection to be provided (unless suitable mechanical ventilation is provided to alleviate the hazard).
- Any hot work of lead base metals, zinc, cadmium, mercury, beryllium, galvanized, or nickel must be done using local exhaust ventilation and/or proper respiratory protection. Contact the Safety Department concerning safe operating procedures or refer to the Respiratory Protection Program.

Fire Watch:

- Fire watch is required when one or more of the following conditions exists:
  - a. Locations where other than a minor fire might develop.
  - b. Combustible materials are closer than 35 feet to point of operation.
  - c. Combustibles that are 35 feet or more away but are easily ignited.
  - d. Wall or floor openings within 35 feet radius with exposed combustible materials.
  - e. Combustible materials adjacent to the opposite side of metal.

- Fire watch training is to be given to every employee prior to performing fire watch activities. Training is to include proper and safe use of fire extinguishers, fire watch requirements, sounding fire alarm/calling authorities, and use of hot work permits.
- Fire watch duties and responsibilities:
  - a. Make certain hot work permit was issued.
  - b. Keep a constant watch on the surroundings.
  - c. Shut down all hot work any time anything out of the ordinary occurs.
  - d. Make certain firefighting equipment is in good order.
  - e. Never leave the area until a qualified replacement is available or 30 minutes after the hot work activity has stopped.
  - f. Have properly charged fire extinguisher, or equivalent in the immediate area ready for use.

## **Gas Welding And Cutting**

### **Transporting, Moving, and Storing Compressed Gas Cylinders:**

- Oxygen cylinders must be stored at least 20 feet from any fuel gas cylinders, flammable gases, or petroleum products; or separated by a noncombustible barrier at least five feet high having a fire-resistance rating of at least 30 minutes.
- Valve protection caps must be in place and secured when cylinders are moved or not in use
- When cylinders are hoisted, they must be secured on a cradle, sling board, pallet, welding cart designed for hoisting of materials, cage, or basket. They cannot be hoisted or transported by means of magnets, choker slings, or by their caps.
- Cylinders must be moved by tilting and rolling them on their bottom edges. They cannot be intentionally dropped, struck, or permitted to drop or strike each other violently.
- When cylinders are transported by powered vehicles, they need to be secured in a vertical position. If they have to be laid down, they must be secured and kept from rolling and striking one another or other objects. When and if acetylene gas bottles are laid down for transporting, they cannot be used for the same amount of time in which they were placed horizontally or a maximum time of one hour after being returned to their upright position.
- Fuel gas and oxygen cylinders can never be used in other than a vertical position.
- Regulators must be removed and valve protection caps put in place before cylinders are moved, unless cylinders are firmly secured on a special carrier intended for this purpose.
- All compressed gas cylinders must be secured in an upright position at all times, unless being hoisted or transported.
- Propane/LP cannot be stored inside buildings.

### Placing Cylinders:

- Cylinders must be kept far enough away from actual welding or cutting operation so that sparks, hot slag, or flame will not reach them.
- Electrodes cannot be struck against a cylinder to strike an arc. No welding, brazing, burning, etc. can be done on any cylinder under any conditions.
- Cylinders containing oxygen, acetylene, or other fuel gases cannot be taken into confined spaces. Keep all cylinders in a well-ventilated area.

### Treatment of Cylinders:

- Cylinders, whether full or empty, cannot be used as rollers or supports.
- No damaged or defective cylinder can be used. Cylinders with leaking valves or safety pressure relieves must be removed as far away as possible from other bottles on the jobsite. The vendor will immediately be called to pick up the defective unit.

### Hose:

- All hoses in use carrying acetylene, oxygen, or any gas or substance which may ignite or enter into combustion, or be in any way harmful to employees, must be inspected at the beginning of each working shift. Hoses which show evidence of damage or excessive wear must be repaired, replaced, or removed from service.
- Hose couplings must be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.
- Boxes used for the storage of gas hoses must be properly ventilated.
- Hoses, cables, and other equipment must be kept clear of passageways, ladders, and stairs.
- Hoses and couplings must be color coded, reverse threaded, or otherwise noticeably different to prevent confusion and intermixing.
- Anti-reverse flow valves must be incorporated at one of the connection points.

### Torches:

- Clogged torch tip openings must be cleaned with suitable cleaning wires, drills, or other devices designed for such purposes.
- Torches in use must be inspected at the beginning of each working shift for leaking cutoff valves, hose couplings, and tip connections. Defective torches cannot be used.
- Torches must be lighted by friction lighters or other approved devices and not by matches or cigarette lighters. The use of hot work as a means of lighting torches is prohibited.

### Regulators and Gauges:

- Before a regulator to a cylinder valve is connected, the valve is to be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust and dirt.)
- Oxygen and fuel gas pressure regulators, including their related gauges, are to be in proper working order prior to their use.
- For quick closing, valves on fuel gas cylinders cannot be opened more than 1-1/2 turns. When a special wrench is required, it is to be left in a position on the stem of the valve, or similarly located for expedient use while the cylinder is being utilized, so that the fuel gas flow can be shut off quickly in case of an emergency.

## **Arc Welding And Cutting**

### Manual Electrode Holders:

- Only manual electrode holders which are specifically designed for arc welding and cutting and which are of a capacity capable of safely handling the maximum rated current required by the electrodes can be used.
- Any current carrying parts passing through the portion of the holder which the welder/cutter grips in his/her hand, and the outer surfaces of the jaws of the holder, must be fully insulated against the maximum voltage encountered to ground.

### Welding Cables and Connectors:

- All arc welding and cutting cables must be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the welder/cutter is working.
- All exposed metal terminal connections to the welder must be insulated with a "rubber lug boot."
- Only cable free from repair or splices for a minimum of 10 feet from the electrode holder to the cable end can be used, except cables with standard insulated connectors or with splices whose insulating quality is equal to that of the original cable are permitted.
- When necessary to connect or splice lengths of cable one to another, substantial insulated

connectors of a capacity at least equivalent to that of the cable shall be used.

- Cables in need of repair cannot be used. They are to be tagged "Do Not Use" and taken out of service.

#### Operating Instructions:

- When electrode holders are to be left unattended, the electrodes must be removed and the holders placed or protected that they cannot make electrical contact with employees or conducting objects.
- Hot electrode holders cannot be dipped in water; to do so may expose the welder/cutter to electric shock.
- Pipelines containing gases, flammable liquids, or conduits containing electrical circuits are not to be used as a ground return.
- All ground connections are to be inspected to ensure that they are mechanically strong and electrically adequate for the required current.
- Oxygen must not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.
- During welding operations, always ground as close to your work station as possible.
- When the welder/cutter needs to leave work or stop work for any period of time, or when the welding/cutting machine is to be moved, the power supply switch to the equipment must be opened.
- Any faulty or defective equipment is to be reported to the supervisor. This equipment is to be tagged "Do Not Use" and removed from service.
- Gas/Diesel welders must be provided with adequate ventilation or vented outdoors to prevent the toxic accumulation of carbon monoxide.

#### Shielding:

- Whenever practicable, all arc welding and cutting operations must be shielded by noncombustible or flame resistant screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

### **Inert-Gas Metal-Arc Welding**

Due to the ultra-violet radiation created by inert-gas metal-arc welding and the decomposition of chlorinated solvents which produces toxic fumes and gases, chlorinated solvents must be thoroughly dry before welding or shielded from the arc or kept clear of operations by at least 200 feet.

Appropriate filter lenses must be worn by the individual performing the welding operations and anyone in the immediate area exposed to the flash when screening or shielding is not feasible (see Table in Hot Work). Welders and other employees exposed to the direct rays must have exposed areas adequately protected to prevent burns to the skin.

When performing work on stainless steel, adequate ventilation or respiratory protection must be implemented to protect against dangerous concentrations of nitrogen dioxide.

### **Training**

Arc cutters and welders, oxygen-fuel cutters and welders and supervisors are to be trained in the safe operations of the equipment to be utilized and the safe use of the process. They are to understand the appropriate requirements of the OSHA Regulations and the American Welding Society Standard(s).

Fire watch personnel are to be trained in the use of fire extinguishing equipment, shutting down machines and/or equipment utilized for hot work and also is familiar with how to sound a fire alarm and/or contact authorities.



**Exhibit A – Hot Work Permit**

# HOT WORK PERMIT

All temporary operations involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to, Brazing, Cutting, Grinding, Soldering, Thawing, and Welding.

**PART A**

**INSTRUCTIONS FOR SUPERVISOR**

- 1. Verify precautions listed at right (or do not proceed with the work).**
- 2. Complete PART A and retain for job files.**
- 3. Post PART B in vicinity of hot work.**

DATE	JOB NO. <div style="text-align: right;">33850</div>
LOCATION/BUILDING & FLOOR (Be Specific)	
DESCRIPTION OF WORK BEING PERFORMED	
NAME OF PERSON DOING HOT WORK	
<p>The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.</p>	
SIGNED: _____ <div style="text-align: center;">(Supervisor)</div>	
SIGNED: _____ <div style="text-align: center;">(Welder/Burner)</div>	
SIGNED: _____ <div style="text-align: center;">(Fire Watch/If Needed)</div>	
TIME STARTED:	Date: _____ Time: _____ AM/PM
EXPIRATION:	Date: _____ Time: _____ AM/PM

**HOT WORK CHECKLIST**

- Sprinklers and hose streams in service/operable.
- Hot Work Equipment in good condition (e.g., power source, welding leads, torches, etc.)
- ABC multi-purpose fire extinguisher and/or water pump can.

**REQUIREMENTS WITHIN 35 FEET OF WORK**

- Dust, Lint, Debris, Flammable Liquids and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Combustible floors (e.g., wood, tile, carpeting) wet down, covered with damp sand or fire blankets.
- Remove flammable and combustible material where possible. Otherwise protect with fire blankets
- All wall and floor openings covered.
- Walkways protected beneath hot work.

**WORK ON WALLS OR CEILINGS**

- Combustibles moved away from other side of wall.

**WORK IN CONFINED SPACES**

- Confined space cleaned of all combustibles (example: grease, oil, flammable vapors).
- Containers purged of flammable liquids/vapors.
- Follow confined space guidelines.

**FIRE WATCH/HOT WORK AREA MONITORING**

- Fire watch will be provided during and for 30 minutes after work, including any coffee or lunch breaks.
- Fire watch is supplied with an extinguisher, and/or water pump can, also making use of other extinguishers located throughout work area.
- Fire watch is trained in use of this equipment and familiar with location of sounding alarm.
- Fire watch may be required for opposite side of walls, above, and below floors and ceilings.

**OTHER PRECAUTIONS TAKEN**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**NOTE: FILL OUT EMERGENCY INFORMATION ON BACK OF FORM.**



FORM NO. S-24 (REV. 01-06)

**Exhibit B – Hot Work Warning**

**WARNING!**

**HOT WORK IN PROGRESS  
WATCH FOR FIRE!**

**IN CASE OF AN EMERGENCY:**

**CALL:** \_\_\_\_\_

**AT:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**WARNING!**



**Safety Program**

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

## Housekeeping and Sanitation

Good housekeeping is a primary concern to all jobsite supervision. This must be planned from the beginning of the project and carefully supervised throughout the remainder of the project. A clean and organized construction site not only prevents incidents, but also provides proper utilization of available space.

Responsibility for good housekeeping is the responsibility of everyone on a Boldt jobsite. Workers cleaning up the jobsite must wear appropriate personal protective equipment. This task requires appropriate gloves and may also include items such as hard-soled shoes, face shields, and respiratory protection.

All materials must be stored in neat stockpiles for easy access. Tie down or support piles to prevent falling or shifting. Loose materials and waste must be cleaned up promptly and kept away from stairs, platforms, and shaft openings. Aisles, walkways, ladder bases, and the bottoms of stairways will be kept clear of obstructions and waste receptacles cannot be allowed to overflow with accumulation. Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse. Protruding nails must be removed or bent over so they no longer present a risk.

Spills of oils, grease, and water must be properly and adequately cleaned up with an absorbent material and disposed of according to local rules and regulations. There must be unobstructed access, at all times, to emergency exits, fire extinguishers, safety disconnect switches, and the like.

Proper sanitation at the jobsite is essential to eliminate contamination, odor, and infestation. Toilet facilities, at a minimum, must be provided as follows:

<u>Employees</u>	<u>Facilities (1 urinal, 1 toilet seat)</u>
1-20	1
20-200	1 per every 40 employees
200+	1 per every 50 employees

To ensure cleanliness, waste disposal must comply with local sanitation laws and cannot cause ground contamination.

A means of hand washing shall be provided for employees. Options include hand wash stations with soap or hand sanitizer. Hand wash stations will be provided with soap, adequate supply of water, and hand towels.

An adequate supply of drinking water must be provided at a readily accessible location (i.e., tool trailer, break area), and be clearly marked/identified as such. These coolers will have disposable cups, as well as a trash receptacle for waste. Any employee observed removing the lid of a water container, except for workers assigned to refill or sanitize, may be subject to disciplinary action. These containers will be cleaned periodically and refilled as needed.

Any sources of non-potable water that is accessible on the site shall be identified with signs and shall not be used for drinking or washing. There shall be no cross-connection, or potential connection between a potable water and a non-potable water.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

## Material Handling and Storage

Temporary and permanent storage of materials must be kept neat and orderly. These stockpiles must be properly separated as to type, size, and length to prevent them from shifting or falling. Cross-piling, tie downs, or other means of support may be necessary.

All areas of work and walkways must be cleared of all obstructions. Emergency fire equipment must be made available without hindrance, and storage must be kept a minimum distance away from automatic sprinkler heads (18") and electric panels (36"). Emergency exits and areas should always remain clear for access/egress.

Petroleum products must be stored in nationally-recognized, such as Underwriter's Laboratory, approved containers and labeled according to Boldt's Hazard Communication Program. Grounding, venting, handling, and storage of these products require particular attention to fire hazards. Additional personal protective equipment may also be required. Fire extinguishers must be stored a minimum of 25 feet, but less than 75 feet, away from the storage location. Warning signs need to be posted stating:

### **FLAMMABLE -- KEEP FIRE AWAY**

Flammable liquids and gases can be ignited by open flames, sparks, or excessive heat, so it is necessary to consider these factors when establishing a staging area or tool crib. Oxygen cylinders must be separated from fuel gas by a distance of 20 feet, or by a noncombustible barrier at least five foot high with a thirty minute fire-resistance rating, and all cylinders must be secured and have a valve protection cap on, when not in use.

Proper storage and material handling procedures will safeguard a jobsite against potential incidents, as well as increase productivity while maintaining materials and equipment in working condition.

Supervision must plan the most efficient and safe method to accomplish the task of material handling. Always know your personal limitations and ask for help when lifting heavy or awkward equipment or materials. Proper tools and equipment must be considered during preplanning to minimize exposure. Special precautions must be taken to prevent strains and sprains from improper lifting and carrying procedures. When lifting, have sure footing; bend your knees, keeping your back straight while holding the object close to your body. Always use your leg muscles rather than your back muscles and avoid bending at the waist. When carrying material, make sure your path of travel has been cleared and that your line of sight is not obstructed.

When using a boom line to lift materials, do not hold the line or place hands on or under the sling until the load is released. Have one person signaling or giving commands when team-lifting large loads and always stay in constant communication with each party.



## Safety Program

### D. Policy and Procedures

Reviewed: January 4, 2019

Effective: December 22, 2001

## Motor Vehicles & Mechanized Equipment

### Purpose

Motor vehicle and mechanized equipment safety covers all cars, trucks, tractor-trailers, and light and heavy highway equipment owned or leased by Boldt. It is the intent of this policy to provide awareness and guide those employees who operate, ride, or are otherwise involved with these items.

### General Requirements

- All those who will be driving for Boldt must have a valid and current license,
- Drivers must follow safe driving practices and must abide by all state and federal rules and regulations such as not exceeding the speed limit, and maintaining a safe distance from other vehicles. Drivers must not operate their cell phone or other distracting equipment while driving. All employees operating vehicles and the passengers in these vehicles are required to wear seat belts at all times. Authorized drivers also can't operate vehicles while under the influence of alcohol, illegal drugs, or medications that might impair their driving.
- Only authorized employees will operate a motor vehicle within the scope of the work to be performed. A driver cannot permit unauthorized persons to drive, operate, or ride in a vehicle that is either owned or leased by Boldt.
- Employees cannot jump on or off vehicles in motion.
- Extreme caution must be exercised when backing a vehicle, avoiding incident to persons or property. If the view is obstructed to the rear, a second employee must be stationed at the rear of the vehicle to assist the driver in backing the vehicle safely. Back-up audible alarms may be required in certain instances.
- Materials and loads must be securely fastened to prevent a hazard due to shifting, and be within the vehicle manufacturer's load limits. Employees cannot support or steady loads while the vehicle is in motion.
- Material which extends more than four (4) feet beyond the front or back of the truck or trailer must have warning devices attached. During the day, red flags can be used; at night and during periods of poor visibility, red lights must be used and attached to the trailing end of the longest piece.
- Employees must be seated, with arms and legs within the confines of the vehicle.
- The driver of a vehicle must be courteous toward other operators and pedestrians. The vehicle must be operated in a safe manner and the right of way must be yielded to pedestrians and other vehicles when failure to do so might endanger any person or another vehicle.
- Keys cannot be left in company vehicles overnight.
- All equipment must have proper barricades or flashers when parked next to roadways at night.
- All equipment cab glass shall be safety glass or equivalent.
- Contact the safety department prior to working within 25 feet of power lines.
- Whenever equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.

- Any traffic or parking citations issued while operating a company vehicle are the responsibility of the employee.
- Vehicles must be appropriate for the intended use and only used for its designed purpose, and maintained in a safe working order.

### **Inspection**

- Where required by DOT or Boldt Policy, checklists for the complete vehicle inspection must be completed on a daily basis.
- The driver must report any defects that may have occurred during the day. Items that affect safety must be repaired immediately.
- Employees cannot knowingly operate defective or unsafe vehicles.

### **Maintenance**

- The Maintenance Department, as well as the operator(s) must be responsible for maintaining company vehicles and motorized equipment in a safe condition.
- Any equipment with loaders, dump bodies, or similar equipment must be lowered or properly blocked before beginning repair work.
- Before starting repair work, all controls shall be in the neutral position, with the motors stopped and brakes set, unless the work being performed requires otherwise.
- The Safety Department will provide any new information or revised standards to the Maintenance Department so they're aware of any changes in the laws.

### **Incidents**

If an incident occurs, the following steps need to be taken:

1. Stop immediately. Take all precautions to prevent further accidents at the scene.
2. Send for help; do not leave. Ask a passing motorist or some other person to contact the police; call for an ambulance if necessary.
3. Render all reasonable assistance. Render assistance to all injured persons. Refrain from moving injured persons, unless not doing so would likely cause greater harm or damage.
4. Retrieve a report in the glove compartment, or where other important vehicle information is stored, and complete it after notifying your supervisor.
5. Do not make a statement of any kind to anyone other than your employer, a law enforcement officer, or a representative of your insurance company.
6. Report the incident to the Safety Department during office hours, or during non-office hours:
  - Cory Goldschmidt, Corporate Safety Director
  - Office: 920-225-6168
  - Cell phone: 920-470-2076
  
  - Greg Reitzner, Manager, Equipment/Warehouse
  - Office: 920-739-6321 extension 6288
  - Cell phone: 920-858-1428



## Safety Program

### D. Policy and Procedures

Reviewed: January 4, 2019

Effective: February 6, 2007

## Office Safety

### Purpose

Office safety addresses the necessary guidelines for providing a safe working environment in both the home office and work-site office locations. Office is defined as all offices within Company-owned or Company-occupied property boundaries including buildings, building grounds, and parking lots. It includes the basic safety practices expected in an office environment and is to be used only as a basis for establishing office safety rules that will be made site-specific for a given location.

### General Requirements

Office and work station rules should be established by following the guidelines as listed below for efficiency, convenience, and safety:

- Walk, never run
- Avoid reading while walking
- High heels increase the risk of a fall; low-heel shoes are preferable
- Shoes must be worn at all times in the work area

Every building designed for human occupancy must have exits sufficient to allow the prompt escape of occupants in case of emergency.

Exits and the way of approach and travel from exits must be maintained so that they are unobstructed and are accessible at all times. All exits must discharge directly to the street or other open space that gives safe access to a public way.

A minimum width of 3 feet should be established for aisles. Obstructions such as wastebaskets, telephone and electrical outlets, tables, and office equipment must be placed where they do not present tripping hazards.

Doors should not open into the path of employee travel; however, if they do, the floor should be marked indicating the swing of the door.

All floor surfaces must be kept clean, dry, and free from protruding nails, splinters, loose boards, holes, or projections.

Clean up liquid spills immediately especially on stairs or tile floors.

All floor finishes and/or carpets should be selected for anti-slip qualities. Well-maintained floors and carpets will protect against slips and falls.

Defective tile or carpet should be repaired immediately.

Stairways should be protected with anti-slip material.

Use handrails, take one step at a time, keep to the right and do not hurry.

Don't store or throw anything on steps or stairways.

It is recommended that you do not descend stairways in high-heel shoes in an emergency situation. Keep a pair of low-heel shoes handy.

Walk, don't run for an elevator.

Do not attempt to stop automatic elevator doors with your hands. Wait for the next elevator.

Take extra care when entering or exiting an elevator because the elevator car may not be completely level with the floor when the door opens.

### Computer Workstations

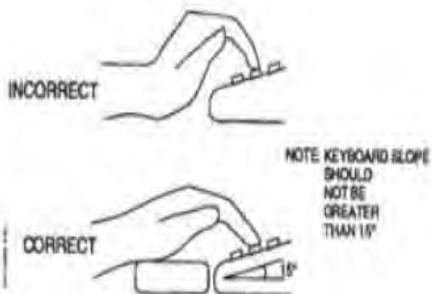
When using computers for long periods of time you should:

- Take breaks and look away from the screen periodically
- Stretch to reduce muscle tension
- Use proper posture and
- Set up your workstation as illustrated

The following diagram depicts the proper workstation set up to reduce injury.



The following diagram depicts the proper wrist positioning for typing.





## **Electrical Equipment**

Do not attempt any electrical repairs unless you are qualified to perform the work. Worn equipment cords must be replaced promptly by qualified personnel.

Do not overload electrical outlets. Use only properly grounded 3-pronged plugs or double-insulated appliances approved by recognized testing laboratories

Note: Your hands should be dry before plugging, unplugging, or operating electrical equipment.

Keep walking areas clear of telephone and electrical cords. Temporary cords which cross walkways or work areas must be securely taped down.

Electric heaters must be turned off when leaving the office. Keep portable heaters away from furniture and other flammable materials. Never block forced-air heater outlets.

To avoid overloading electrical circuits, office maintenance personnel may need to be consulted before using an electric heater.

Avoid leaving microwave ovens unattended when in use.

Keep ties, dangling jewelry and loose clothing away from the paper shredder by standing to the side of the machine while operating it.

Stand in a position which allows immediate access to the on/off switch.

If the shredder does not have an automatic shutoff, turn it off after each use. Avoid overloading the machine.

If the machine gets jammed, do not attempt to manually unjam it unless the power is off and machine is unplugged. Turn off coffee pot warmers when they are not in use.

Keep coffee and other beverages away from electrical equipment such as copy machines.

Some electrical office equipment may need to be unplugged before opening them for servicing such as unjamming, loading, unloading, or adjusting.

## **File Cabinets**

Whenever possible, arrange file cabinets side-by-side and bolted together. Do not overload the upper drawers of file cabinets.

Only one file cabinet drawer should be open at a time. Do not leave an open file drawer unattended.

Close desk and file cabinet drawers when they are not in use. When closing a drawer, grasp the handle to avoid finger injuries.

Do not position file cabinets and files so that open drawers block passageways.

Do not stack two-drawer file cabinets unless they are designed to be stacked and fastened together. Then ensure the heaviest load is in lower filing cabinet drawers.

Do not stack file cabinets on top of tables or desks unless they are designed for such use.

Even if they are bolted to the wall, they may fall if the table is moved because of excessive unsupported weight.

Tall or large file cabinets, bookcases, and cabinets should be bolted to the wall, particularly in libraries or file rooms.

Do not lean, sit, or stand on open drawers.

Do not store objects on cabinets that can become unstable.

## **Furniture**

Furniture should be kept in proper repair. Remove furniture and equipment that are defective or hazardous. Repair or replace furniture that has:

- Sharp burrs or edges
- Splintered edges or slivers
- Broken casters
- Warped or broken seats, etc.

*(Note: When furniture replacement is necessary, safety should be considered (e.g. 5 casters vs. 4 caster chairs, ergonomically designed furniture, etc.).*

Do not stack bookcases on other furniture unless that furniture is designed to accommodate the weight.

To minimize tripping hazards, remove chair mats that are warped, cracked, or broken.

Desk chairs should be stable and level. Do not tilt the chair back to the point where any chair feet leave the floor.

Typewriter and computer stands should only be used for their intended purpose. Do not place typewriters and printers on stands until you have checked the locking latch to verify proper bolting.

## **Office Incidentals**

Remove staples with a staple remover and dispose of used staples properly.

Never overload or force staplers or paper cutters.

Paper cutters must be left in a closed and latched position when not in use.

Paper cutters of proper construction and in good condition require two common sense precautions: keep your fingers away from the blade when it comes down and keep the blade in a down and locked position when not in use. Report any needed repairs immediately.

When stapling an item to a folder, the piercing part of the staple must be directed to the inner portion of the folder.

To avoid paper cuts, do the following:

- Use a moistener to seal envelopes to avoid mouth cuts and germs.
- Pick up individual sheets of paper at the corner.
- Exercise caution when turning book pages or going through files.

Pass scissors handles first, blades together. Keep the scissors where it cannot fall. Keep razor-type cutters, such as X-ACTO knives and box cutters, covered or shielded when not in use.

Do not place pointed objects, such as pencils and pens, with pointed ends upward in containers or pockets. Do not carry pencils behind the ear or between fingers with point toward palm of hand.

Gently wrap broken glass in paper and place in wastebasket or in a special container for this purpose. Never throw loose glass pieces into a wastebasket.

Avoid touching the heated parts of printers or copy machines whenever adding or changing paper or removing paper jams.

Never stick a metal object such as a letter opener into a machine.

Do not allow paper or other materials to accumulate behind copiers or other machinery. When possible, close the cover of copy machines while copying. Avoid looking directly at the intense light.

Handling of solvents and cleaners may require the use of personal protective equipment. Solvent containers should be properly stored with larger volumes possibly requiring special cabinets.

### **Overhead Items And Wall Hangings**

Always use a ladder or step stool to reach articles high above the floor. Never use a swivel chair or other makeshift device to reach high places.

Avoid storing heavy objects above eye level.

Pictures and wall hangings should be secured with the proper fasteners. Do not remain at your desk when overhead work is being performed.

### **Portable Fire Extinguishers**

Portable fire extinguishers suitable to the conditions and hazards involved must be provided and maintained in an effective operating condition.

Portable fire extinguishers must be conspicuously located and mounted where they will be readily accessible. Extinguishers must not be obstructed or obscured from view and must be identified by signs, etc.

## OSHA Inspections

The following information is intended to assist in the event the project becomes the subject of an OSHA/MSHA inspection.

- The inspector must be escorted to the Boldt Field Office prior to the inspection. Obtain the inspector's name from his/her credentials. The name and/or credentials must be recorded, noting whether the Compliance Officer is state or federal. If there is any doubt or if he/she doesn't have formal documentation, call the office which sent the person. This is essential to verify they're an actual employee working for the Occupational Safety and Health Administration or Mine Safety Health and Administration.
- There are different types of inspections. Usually the inspector(s) will explain the reason for inspection. The four types of inspections are: focused, general, complaint, and incident. The focused inspection deals with hazards in these four categories: falls from elevation (floors, platforms, roofs), struck by (falling hazards, vehicles), caught in-between (cave-ins, unguarded machinery, equipment), and electrical (power lines, power tools and cords, temporary wiring). The general inspection deals with hazards encountered on the entire site. A complaint inspection deals solely with a specific employee(s) complaint of a hazard. An incident inspection deals with a major incident, the hospitalization of an employee, or a fatality.
- The inspector generally allows thirty to sixty minutes for an employer's representative to accompany him/her in the inspection. Call the Safety Department for approval to conduct the inspection and/or to accompany the inspector on the walk-around. It is imperative that a company representative (safety personnel, project manager, and superintendent) accompany the inspector during the inspection. An owner representative may need to be contacted prior to an inspection. Subcontractor's representatives need to be contacted as part of professional courtesy.
- During the inspection, note every request or statement made by the inspector (e.g., "Inspector requested to review OSHA forms," "Inspector asked to talk privately with John Jones," "Inspector commented about area without guardrail," etc.)
- Note any equipment used by the inspector and where it was used. Be very specific (e.g., "Inspector took a picture of the scaffold on north wall" or "Inspector plugged in a circuit tester in electric outlet in first floor hallway.") NOTE: If you have equipment designed to perform the same tests, use it at the same time and call the inspector's attention to any differences and see if you can reconcile them and record them on paper.
- BE COOPERATIVE and limit information to that which is requested by the inspector. Remember, anything you say can be used against you in a hearing.
- Prepare and submit to the Safety Director a complete and detailed account of the inspection and post-inspection conference (Exhibit A - OSHA/MSHA Inspection Report). Be sure to include the date and time the inspector arrived, the time the inspection started, time when inspection completed, and the time conference started and ended.
- Instruct the OSHA Compliance Officer to forward any and all correspondence to Boldt's Corporate Office. Send to:

The Boldt Company  
Attn: Corporate Safety Director PO Box 419  
Appleton, WI 54912-0419

OPENING CONFERENCE -- OSHA Inspector reviews safety program and records with company representative(s). Reviews OSHA laws and regulations. Chooses employee representative(s) for walk-around inspection.

||  
v

WALK-AROUND INSPECTION -- OSHA Inspector, employer representative(s) and employee representative(s), if any, tour shop, jobsite, office, store, etc. OSHA notes violations and may interview employees.

||  
v

CLOSING CONFERENCE -- OSHA Inspector reviews findings with Company representative(s). Discusses possible abatement dates for certain items.

||  
v

REGISTERED MAIL TO EMPLOYER -- List of the proposed citations, fines, and abatement dates mailed to employer. Fifteen day period begins to run upon receipt.

||  
v

FIFTEEN DAY PERIOD FOR APPEAL -- Employer decides whether to appeal from any aspect of the official notice.

||  
v

NO APPEAL OR CHANGE -- Fines, citations, and periods for abatement become final and binding. Abatement dates must be met or fines increase.

||  
v

ABATEMENT PERIODS EXPIRE -- OSHA Inspector returns to establishment, re-inspects to be sure that the employer has corrected violations within abatement periods.

# Exhibit A – OSHA Inspection Report



## OSHA Inspection Report

Inspection Date: \_\_\_\_\_  
Page 1 of 3

Job No. \_\_\_\_\_ Job Name: \_\_\_\_\_  
Site Location: \_\_\_\_\_  
Inspector's Name: \_\_\_\_\_  
(attach business card)

What was the purpose of the visit as explained by the Inspector?  
\_\_\_\_\_  
\_\_\_\_\_

Was there a complaint? \_\_\_\_\_  
\_\_\_\_\_

Were you given a copy of the complaint?  Yes  No

Who did the inspector first contact at the jobsite?

Name	Position
------	----------

Did the Inspector show his/her credentials?  Yes  No

Did the Inspector talk with workers/other personnel before showing their credentials?  Yes  No

Did the Inspector take any pictures before he/she arrived and introduced himself/herself?  Yes  No

Were employees from other companies working at the jobsite, and did the Inspector ask for them to be present at the opening conference?  Yes  No

### OPENING CONFERENCE

Who was present? (name of Boldt representative(s); name subcontractors, vendors, owner, etc., and their representative(s))

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

How were employee representatives selected: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

FORM NO. S-21 (REV. 4-01)

**THE INSPECTION**

Person from Boldt accompanying OSHA Inspector:

Name	Position
------	----------

Who was present during the walk-around? \_\_\_\_\_

Were they paid for the time spent?  Yes  No

Comments by the Inspector? (briefly list them) \_\_\_\_\_

Were pictures taken?  Yes  No If so, give exact locations and of what? \_\_\_\_\_

Was any portion of the job shut down?  Yes  No

If yes, for how long? \_\_\_\_\_

Comments: \_\_\_\_\_

Did the Inspector review record-keeping under OSHA?  Yes  No

Name the other companies inspected and whether subcontractor, vendor, or other.

**CLOSING CONFERENCE**

Who was present? (company and representative(s))

Did the Inspector allege that violations took place?  Yes  No

If yes, name them, along with the responsible contractor.

SERIOUS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

OTHER THAN SERIOUS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**TIME SCHEDULE**

Time Inspector arrived: \_\_\_\_\_  
Time opening conference began: \_\_\_\_\_  
Time opening conference ended: \_\_\_\_\_  
Time Inspection began: \_\_\_\_\_  
Time Inspection ended: \_\_\_\_\_  
Time closing conference began: \_\_\_\_\_  
Time closing conference ended: \_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Please notify the Safety Department as soon as possible of an OSHA Inspection. Forward a copy of this report to:

The Boldt Company  
ATTN: Corporate Safety Director  
P.O. Box 419  
Appleton, WI 54912-0419  
Phone #: 920/225-6194  
Fax #: 920/739-4363





## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 18, 2001

## Personal Protective Equipment

### General Requirements

Defective or damaged Personal Protective Equipment (PPE) cannot be used. This equipment must be reported to the employee's immediate supervisor for repair or replacement.

Employee-owned equipment may be utilized provided approval is given by the Boldt Supervision and/or the Safety Department.

A qualified person will be responsible to determine the appropriate PPE to be utilized for the hazard(s) that is present and explain to the wearer (employee) the reason for selection.

PPE for eyes, face, head, extremities, as well as protective clothing, respiratory devices, shields, and barriers will be provided, used, and maintained in a sanitary and reliable condition as necessary due to hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants that may cause incident or impairment from inhalation, absorption, or physical contact.

Prior to the start of any work activity a hazard assessment need to be completed by the Project Manager, Superintendent, and/or Safety Representative.

### Head Protection

Hardhats are to be worn by all personnel while on the construction project including subcontractors, visitors, inspectors, engineers, etc. The exception would be in offices, break trailers, or where the Safety Department has given authorization. The hardhats are to be company-issued meeting applicable ANSI-specifications.

Metallic hardhats are prohibited. Any alteration, such as drilling or cutting, is prohibited. Defective hardhats, which would include the shell and suspension assembly, are to be removed from service and an approved one reissued.

### Eye And Face Protection

All personnel are required to wear eye protection. Safety glasses with side shields meeting Z87.1 standard are required on all job sites under The Boldt Company's control and in maintenance shops. Safety glasses will be provided by the employer. It is recommended that individuals purchase their own ANSI Z87.1 prescription safety glasses. Safety glasses that fit over prescription glasses will be provided by the employer. All eye protection must be issued by each respective employer involved with the project.

The following eye and face protection, or the equivalent, is required for the following activities:

- Concrete chipping -- goggles or face shield over safety glasses
- Powder-actuated tools -- safety glasses or goggles
- Grinding -- face shield over goggles or safety glasses
- Welding -- proper tinted welder's helmet over safety glasses
- Gas cutting/burning -- proper tinted goggles/hood
- Chemicals/acids -- chemical goggles and face shield

## Hearing Protection

\*Hearing protection is provided and used when the levels exceed those listed below: Duration per day - hours Sound Level - dBA

Duration per day – hours	Sound Level – dBA
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

\*See Boldt's Hearing Conservation Program for more specific details regarding this topic.

## Footwear

Shoes/boots that are acceptable will have a hard-sole and upper leather, will fit properly, and will be in good repair. The use of tennis shoes or "street" shoes is not permitted.

When the activity involves a high risk for foot injury (jack hammering, tampers, etc.), the individual is required to wear approved safety-toed shoes or company-issued slip-over guards.

On projects where the owner has made safety toed shoes mandatory, the employee will be responsible to comply with this requirement as a condition of employment. Safety-toed tennis shoes, or similar items, are not permitted.

## Hand Protection

Gloves are provided and must be worn when an employee is to handle any hazardous chemicals. Also, work gloves are available and need to be ordered by the job-site Superintendent/Project Manager. It is recommended that these be worn during demolition, material handling, and similar activities that may pose a hazard(s) to the hand(s).

## Work Clothing

Each employee must be dressed in a minimum of long pants, socks, and shirt that covers the shoulders. Clothing that is loose fitting, torn, or frayed is not to be worn.

## Working Over Or Near Water

When work is performed over or near water where the danger of drowning exists, each employee will be provided a U.S. Coast Guard approved life jacket or buoyant work vest.

Ring buoys with a minimum 90 feet of line must be made available at intervals of every 200 feet. A life-saving boat with oars is to be made available at the job location.

## Working Around Vehicular Traffic

Employees will be provided orange or red traffic safety vests when exposed to vehicular traffic (public streets, roads, and highways). Each employee engaged in directing traffic is to be equipped with orange flags and trained by a competent person. Night work requires the use of reflective vests and flags.

## **Safety Harnesses And Lanyards**

A safety harness is to be provided and properly utilized when an employee is exposed to falls exceeding six feet. Lanyards, or similar fall arrest equipment, are to be connected to minimize the drop as much as possible and must be equipped with a double-locking (two action) snap. Any fall arrest equipment subjected to loading is to be removed from service. These safety devices are to be used as indicated by the manufacturer. Any other uses such as hoisting material are strictly forbidden.

## **Training**

Each employee will receive training and information during the following:

- During orientation
- At the time of initial assignment.

Information will include the following:

- When PPE is required as well as the type necessary
- How to properly put on and wear the item as well as removing it
- Limitations of the PPE
- Proper care and maintenance
- Useful life and disposal of the PPE

Training is to be repeated if there is a change in operations that presents a hazard that an employee has not been previously trained, when there is reason to believe that there have been deviations from the procedure or that there are inadequacies in the employee's knowledge, use of this procedure, or a new hazard has been created.

Training must be completed and formally documented.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

### Powder-Actuated Tools

Powder-actuated tools operate like a loaded gun and must be treated with extreme caution. In fact, they are so dangerous that they must be operated only by specially trained and certified employees. Training is to be completed by an authorized instructor.

The tool is to be tested each day before loading to see that the safety devices are in proper working order. Testing method is to be in accordance to manufacturer specifications. Any tool found defective is to be immediately removed from service.

When using powder-actuated tools, an employee must wear suitable ear, eye, and face protection. The user must select a powder level - high or low velocity - that is appropriate for the Powder-actuated tool and necessary to do the work without excessive force.

Loading of the tool is not to be done until just prior to the intended firing time. Never point the tool at anyone and keep hands clear of the open barrel end. Loaded tools are not to be left unattended. The muzzle end of the tool must have a protective shield or guard centered perpendicular to and concentric with the barrel to confine any fragments or particles that are projected when the tool is fired. A tool containing a high-velocity load must be designed not to fire unless it has this kind of safety device. To prevent the tool from firing accidentally, two separate motions are required for firing. The first motion is to bring the tool into the firing position, and the second motion is to pull the trigger.

The tool must be able to operate until it is pressed against the work surface with a force of at least 5 pounds (2.2 kg) greater than the total weight of the tool. If a powder-actuated tool misfires, the user must hold the tool in the operating position for at least 30 seconds before trying to fire it again. If it still will not fire, the user must hold the tool in the operating position for another 30 seconds and then carefully remove the load in accordance with the manufacturer's instructions. This procedure will make the faulty cartridge less likely to explode. The bad cartridge should then be put in water immediately after removal. If the tool develops a defect during use, it should be **tugged** and must be taken out of service **immediately** until it is properly repaired.

Safety precautions that must be followed when using powder-actuated tools include the following:

- Do not use a tool in an explosive or flammable atmosphere.
- Inspect the tool before using it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions and has the proper shield, guard, and attachments recommended by the manufacturer.
- Do not load the tool unless it is to be used immediately.
- Do not leave a loaded tool unattended, especially where it would be available to unauthorized persons.
- Keep hands clear of the barrel end.
- Never point the tool at anyone.

When using powder-actuated tools to apply fasteners, several additional procedures must be followed:

- Do not fire fasteners into material that would allow the fasteners to pass through to the other side
- Do not drive fasteners into very hard or brittle material that might chip or splatter or make the fasteners ricochet.
- Always use an alignment guide when shooting fasteners into existing holes
- When using a high - velocity tool, do not drive fasteners more than 3 inches (7.62 cm) from an unsupported edge or corner of material such as brick or concrete.
- When using a high - velocity tool, do not fasteners in steel any closer than 1/2 inch (1.27 cm) from an unsupported corner edge unless a special guard, fixture, or jig is used.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: February 2, 2007

## Powered Industrial Trucks

### Purpose

The purpose of this program is to establish criteria for the training of industrial truck operators and ensure employee health and safety while operating and/or working around powered industrial trucks. This program is referenced by OSHA - 29CFR 1910.178 and 1926.602.

### Scope

This program covers all Boldt Company employees who operate a Powered Industrial Truck (referred to as “forklift”). Examples include forklifts and All Terrain Extendable Boom forklifts.

### Lift Truck Requirements

All trucks owned or leased shall be of the approved type and conform to the design requirements of ASME/ANSI B56.1-1988.

All trucks shall bear a label or some other identifying mark indicating approval by a testing laboratory.

All sit-down forklifts that do not currently have a seat belt shall be retrofitted by the manufacturer with the appropriate safety belt, provided the manufacturer has a retrofit program in place.

Trucks shall be equipped with a load backrest to prevent the load from falling toward the truck when the load is elevated and tilted back.

Trucks will be equipped with back-up alarms where required by law or at an Owner’s request.

### Responsibilities

#### Safety Department:

- Coordinate and conduct operator training, and assign hands-on training tasks suitable for the new operator’s skill and experience.
- Conducting accident investigations for all accidents and near miss incidents.

#### Operator Responsibilities:

- Operating a powered industrial truck only if trained and certified.
- Operating in accordance with this procedure and safe operating practices.
- Inspecting the equipment and completing an inspection form at the beginning of each shift. (Appendix A)
- Immediately reporting any problems or unsafe conditions to their immediate supervisor. Only operating equipment that is in safe operating condition.
- Reporting all accidents, incidents and near misses regardless of damage or injury, immediately to their supervisor.
- Before loading and unloading from mobile stock, the operator will verify trailer is chocked and dock plates are secured.

### Operator Training:

- New operators shall complete an initial training program prior to operating a forklift.
- Training consists of a classroom type setting focusing on equipment operating characteristics and safe operating procedures.
- Hands-on skill evaluation conducted by the trainer and/or supervisor. (Appendix B)
- Operators shall complete a hands-on review at least once every three years. Refresher training is also required whenever an operator demonstrates a deficiency in the safe operation of the truck, has been involved in an accident or near-miss incident or if the supervisor believes the operator does not present the knowledge and skills necessary to safe forklift operations.
- Training shall be documented with the employee's name, trainer's name, date, and an outline of the training program or copies of the training materials. The Safety Department will maintain all records.

### Maintenance and Inspection:

- Only trained and authorized personnel shall be permitted to maintain, repair, and adjust industrial trucks.
- The operator shall complete a daily inspection form at the beginning of each shift. All forms shall be sent to the Maintenance operations in Appleton, WI for Boldt owned equipment. All other inspections should be kept on the jobsite.
- If at any time a forklift is found to be in any way unsafe, it shall be taken out of service immediately until it has been restored to safe operating condition. The key shall be removed and given to supervision on the jobsite and a "Do Not Operate" tag placed on the vehicle that is unsafe to operate to prevent others from using the truck.

### Rules for Safe Operation:

- Only trained and authorized personnel are permitted to operate a powered industrial truck.
- Only the operator is allowed on the truck - No Riders. No person shall be allowed to stand or pass under the elevated portion of any lift truck, whether loaded or empty.
- Only an approved safety platform (cage) may be used for lifting personnel, not pallets. The platform may only be used for lifting personnel: not for transporting them from one location to another. (Platform must meet government regulations) (Appendix C)
- Only safety platforms, which are firmly secured to the lifting carriage and/or forks, shall be allowed when working from a forklift. Individuals working inside the cage shall wear fall protection harness and lanyard.
- Protection from falling objects shall be provided either by an overhead guard or personal head protection. The lift truck operator shall remain at the controls. Only minor adjustments or movements may be made and only at creep speed.
- Forks must be kept as low as possible, whether loaded or empty, at all times.
- Do not move material that is on damaged pallets, incorrectly loaded, or otherwise unsafe to handle.
- The brakes must be set and wheel chocks must be placed under the rear wheels of trucks, trailers or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semi-trailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor.
- All traffic regulations shall be observed. Acceptable speed limit of 5mph shall be observed unless otherwise posted. A safe distance shall be maintained between vehicle and pedestrians (approximately three truck lengths), and the truck shall be kept under control at all times.
- The driver shall be required to slow down and sound horn at cross walks and other locations where vision is obstructed. As a best practice, spotters may be utilized while maneuvering in tight areas or around high dollar equipment and personnel. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

- If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service and tagged “Do Not Operate” until it has been restored to safe operating condition.
- Never park the lift truck where it may block an exit, stairway, hallway, door, emergency equipment, fire extinguisher or electrical service panel. Wheels must be blocked if the truck is parked on an incline.
- A powered industrial truck is unattended when the operator is 25 feet or more away from the vehicle or whenever the operator leaves the vehicle and it is not in view. When a powered industrial truck is left unattended, the load engaging means must be fully lowered, controls neutralized, power shut off and brakes set. When the operator of an industrial truck is dismounted and within 25 feet of the truck still in his or her view, the load engaging means must be fully lowered, controls neutralized and the brakes set to prevent movement.

#### LPG (Propane) Safety:

- No truck may be operated with a leak in the fuel system. Fuel tanks shall not be filled while the engine is running.
- The valve on the fuel cylinder must be closed when the forklift is not in operation and parked overnight. The LPG tank should be shut off when “garaging” (leaving the lift truck in a closed space or room or leaving the truck out of service for 8 hours or more) the lift truck.
- The fuel cylinder must always be secured in the brackets when the forklift is in operation. Fuel cylinders, empty or full, may not be stored inside the building.
- If a fuel cylinder is leaking and can be safely handled, remove the leaking tank to fresh air, well away from buildings and any sources of ignition. Due to the fire hazard, securing the area and allowing the cylinder to empty itself is preferred to attempting to repair the leak.
- LPG cylinders shall be stored in a safe, secure area that is suitable for flammable materials. No smoking signs should be posted in the area.



# Exhibit A – Forklift Inspection Report



## Forklift Inspection Report

Week Ending: \_\_\_\_\_

Boldt Equipment #: \_\_\_\_\_  
 Project #: \_\_\_\_\_

Type of Forklift: \_\_\_\_\_  
 Project Location: \_\_\_\_\_

Instructions: 1) This report is to be completed prior to use. Use codes for each item listed below. All defective items shall be recorded below (comments) and reported to the on-site project manager/superintendent immediately.  
 2) After completing the form, forward original to Maintenance Department and maintain yellow copy in the jobsite file.

Codes: G = New or Good Condition; N/A = Not Applicable; R = Needs Immediate Repair; M = Missing (needs replacement)

Date	Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Comments <i>(Indicate date of repairs)</i>
Daily Visual Checks								
1. Operator's Manual								
2. Fire Extinguisher								
3. Capacities & Load Chart								
4. Oil Level- Hydraulic/Engine/ Transmission								
5. Engine Coolant System								
6. Charging System & Battery								
7. Engine Drive Belts								
8. Exhaust System								
9. Tires: Condition & Pressure								
10. Lug Nuts on Wheels								
11. All Grease Fittings								
12. Oil and Coolant Leaks								
13. Mast Carriage & Forks								
14. Lift Chain Condition & Adjustment								
15. All Guards in Place								
16. Safety Decals								
17. Seat Belt								
18. Glass in Cab								
19. Horn/Backup Alarm								
20. Gauges- Oil/Volt/Temp./Fuel								
21. Steering Selector System								
22. Brakes & Parking Brake								
23. Neutral Safety Switch								
24. Hour Meter								
25. Strobe Lights								

Signature of operator inspecting lift:

Sun. \_\_\_\_\_  
 Mon. \_\_\_\_\_  
 Tues. \_\_\_\_\_  
 Wed. \_\_\_\_\_

Thur. \_\_\_\_\_  
 Fri. \_\_\_\_\_  
 Sat. \_\_\_\_\_

Copy Distribution: Original-Maintenance Dept.; Yellow-Maintain in Jobsite File

FORM NO. S-42 (REV. 6/02)

# Exhibit B – Forklift Evaluation Checklist



## Forklift Evaluation/Checklist

Operator's Name: \_\_\_\_\_  
 Date: \_\_\_\_\_ Trainer: \_\_\_\_\_  
 Job # /Location: \_\_\_\_\_

Evaluation/Performance Checklist	Satisfactory	Needs Improvement	N/A
<b>Completes Forklift Inspection Report</b>			
<b>Proper Use of Controls</b>			
✓ Clutch			
✓ Inching Control			
✓ Tilt			
✓ Lift			
✓ Attachments			
✓ Steering			
<b>Proper Procedures for an "Unattended" Vehicle</b>			
<b>Basic Maneuvering</b>			
✓ Starts and Stops Smoothly			
✓ Maintains Proper Speed			
✓ Scans the Area Effectively			
✓ Uses Horn When Necessary			
✓ Keeps Body Parts Within the Vehicle			
<b>Picking Up the Load</b>			
✓ Matches Load with Truck's Capacity			
✓ Checks Load for Stability			
<b>Driving with the Load</b>			
✓ Travels with the Load Close to the Ground			
✓ Keeps an Adequate Following Distance			
✓ Drives in Reverse with Oversized Loads			
✓ Maintains a Safe Speed			
<b>Stacking the Load</b>			
✓ Approaches the Load Squarely			
✓ Stacks straight, Not Too High			
✓ Deposits Load Properly			
✓ Lowers Forks Prior to Moving			
<b>Loading/Unloading Trailer and/or Other</b>			
✓ Checks the Dock Plate			
✓ Checks the Condition of the Floor			
✓ Checks the Trailer Chocks, Jack Stands and/or Brakes			

## Exhibit C – ANSI Standard – Elevating Personnel

ANSI B56.6-1987

### 5.15 Elevating Personnel

Whenever a truck is used to elevate personnel, the following precautions for the protection of personnel shall be taken.

- Provide a personnel platform which complies with the design requirements listed in part III of this standard (Contract Safety Department)
- Be certain that the platform is securely attached to the lifting carriage or forks
- Be certain that the lifting carriage and forks are secured to prevent them from pivoting upward.
- Provide protection for personnel in their normal working position on the platform from moving parts of the truck that represent a hazard.
- Provide overhead protection as indicated to be necessary by the operating conditions.
- Be certain that the lifting mechanism is operating smoothly through its entire lift height.
- Are certain that the mast is vertical do not operate on a side slope.
- Be certain that the platform is horizontal and never lift platform forward or rearward when elevated.
- Be certain that the truck has a firm and level footing.
- Be certain that required restraining means such as railings, chains, cable, harness with lanyard(s), etc. are in place and used.
- Place truck in neutral and set parking brake
- Before elevating personnel, area should be marked with cones or other device to warn of work by elevated personnel.
- Lift and lower smoothly and with caution.
- Watch for overhead obstructions and electrical wires.
- Keep hands and feet clear of controls other than those in use.
- Move truck only for minor adjustments in positioning when personnel are on the platform.
- Alert personnel on the platform before moving truck. Then move truck smoothly and with caution.
- A trained operator shall be in position to control the truck or available to operate controls, when the operator is not in the operating position, the truck wheels should be blocked.
- The combined mass (weight in pounds) of the platform, load, and personnel shall not exceed one-fourth of the capacity at the related load center and maximum forklift height as indicated on the information plate of the truck on which the platform is used.
- Personnel are to maintain firm footing on platform floor unless secured by harness and lanyard. Use of railings, planks, ladders, etc. on the platform for purpose of achieving additional reach or height is prohibited.
- Be certain that personnel and equipment on the platform do not exceed the available space.
- Platform shall be lowered to floor level for personnel to enter and exit. Personnel shall not climb on any part of the truck in attempting to enter and exit.
- Any harness, lanyard, or deceleration device which has sustained permanent deformation shall be replaced.



## Safety Program

### D. Policy and Procedures

Reviewed: January 4, 2019

Effective: December 22, 2001

## Safety Meetings

All employees will regularly attend scheduled safety meetings. It is the responsibility of each project manager/superintendent to ensure that safety meetings are conducted. To assist in this objective, the Safety Department will provide any timely material which is appropriate. Guidelines for safety meetings are as follows:

- Safety meetings are to be of 10-15 minutes in duration, held at least once each week, and be related to the specific tasks being performed on the project. It is highly recommended that safety meetings be conducted on Monday mornings to start off a safe work week.
- Absent employees will be given the information that was covered during the meeting upon their return.
- Superintendents must meet and discuss safety with their foremen on a regular basis. This can be accomplished as part of an existing production meeting. The pertinent information must be communicated to the trade employees by their foremen.
- All safety meetings are to be documented using the Weekly Safety Meeting Report. It is also asked that all information requested on the form be completed in its entirety. In the event the attendee's signature is not legible, have the person's name printed.
- Other possible topics for safety meetings can be furnished by the Safety Department. These will come from the Associated General Contractors, the insurance carrier, the fire department, the Department of Workforce Development, etc. "On-the-Job" and periodic "Off-the-Job" safety topics are appropriate for discussion at employee safety meetings. Administrative matters may supplement the safety topic, although are not appropriate stand-alone topics.
- Management/Supervision must "lead by example". To fully get employees to embrace safety on the project, these individuals need to be present during safety meetings as well as actively participate or express their thoughts to promote the safety effort.



# WEEKLY SAFETY MEETING REPORT

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Job No. \_\_\_\_\_ Job Description: \_\_\_\_\_

Supervisor/Trainer: \_\_\_\_\_

Topics Discussed:  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Has any employee seen an unsafe condition or potential problems on the project?  
1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

Please **PRINT** name:  
1. \_\_\_\_\_ 13. \_\_\_\_\_  
2. \_\_\_\_\_ 14. \_\_\_\_\_  
3. \_\_\_\_\_ 15. \_\_\_\_\_  
4. \_\_\_\_\_ 16. \_\_\_\_\_  
5. \_\_\_\_\_ 17. \_\_\_\_\_  
6. \_\_\_\_\_ 18. \_\_\_\_\_  
7. \_\_\_\_\_ 19. \_\_\_\_\_  
8. \_\_\_\_\_ 20. \_\_\_\_\_  
9. \_\_\_\_\_ 21. \_\_\_\_\_  
10. \_\_\_\_\_ 22. \_\_\_\_\_  
11. \_\_\_\_\_ 23. \_\_\_\_\_  
12. \_\_\_\_\_ 24. \_\_\_\_\_



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: November 1, 2001

## Safety of Sub/Trade Contractors

As directed in the Subcontract/Trade Contract Agreement, the subcontractor/trade contractor agrees to comply, at its own expense, with all federal, state, and municipal laws and regulations applicable to the work covered by the contract documents involving OSHA and Worker's Compensation, as well as any safety rules or policies promulgated by Boldt or Owner/Client in connection with the project.

The subcontractor/trade contractor must immediately notify Boldt Management/Supervision of any incidents by the most expedient means available and thereafter submit, within three (3) calendar days of the occurrence of any accident/injury, copies of all reports arising out of any accident/injury sustained by their employees or those of any firm or individual to whom it may have sublet work, or any property damages arising or alleged to have arisen on account of any work done.

### General

Copies of a formal safety program, along with evidence of training, will be maintained on the project by each contractor. Each contractor must assign an on-site individual who will be responsible for all safety information and documentation.

Each contractor is responsible for providing all necessary personal protective equipment (PPE) as required by Boldt and/or the Owner/Client Policies and Procedures. Failure to provide and require the proper use of this equipment may be grounds for removal from the project. In limited situations, if providing the necessary PPE that was supposed to be issued by the contractor, Boldt reserves the right to charge an additional percentage above the cost of the items being utilized. As part of the Hazard Communication Program (HAZCOM), an inventory of all Safety Data Sheets (SDS) of each product on the project is to be maintained by each subcontractor. A copy of the SDS is to be submitted to Boldt's on-site supervision upon request. Housekeeping is everyone's responsibility. If an area isn't kept clear/clean of debris to the satisfaction of Boldt's Management/Supervision and after notification without resolution, the items will be completed with the cost being incurred by the responsible contractor (back charge).

### Expectations/Responsibilities

Although some items may exceed certain requirements/regulations, it is Boldt's expectation that each contractor, while performing services for Boldt, will conform to the policies and procedures stated within, as well as any special programs when applicable. If certain requirements/items cannot be complied with or met, each contractor must notify Boldt Management/Supervision as to the reason(s) for noncompliance.

Contractors must realize that this manual may be used as a guide but doesn't relinquish each contractor's responsibility to meet any additional requirements, which may be covered by other federal, state, municipal, or owner/client regulations.

**Boldt may amend the project work/safety rules as necessary**



## Scaffold Safety

### General Requirements

#### Capacity:

- Each scaffold and scaffold component must be capable of supporting, without failure, its own weight and at least four times the maximum intended load applied or transmitted to it.
- Each suspension rope, including connecting hardware, used on non-adjustable suspension scaffolds must be capable of supporting, without failure, at least six times the maximum intended load applied or transmitted to that rope.
- The stall load of any scaffold hoist cannot exceed three times its rated load.
- Scaffolds must be designed by a qualified person and must be constructed and loaded in accordance with that design.

#### Scaffold Platform Construction:

- Each platform on all working levels of scaffolds must be fully planked or decked between the front uprights and the guardrail supports. Scaffold platforms and walkways must be at least 18 inches wide.
- Where scaffolds must be used in areas that the employer can demonstrate are so narrow that platforms and walkways cannot be at least 18 inches wide, such platforms and walkways must be protected from fall hazards by the use of guardrails and/or personal fall arrest systems.
- The front edge of all platforms cannot be more than 14 inches from the face of the work, unless guardrail systems are erected along the front edge and/or personal fall arrest systems are used.
- The maximum distance from the face for outrigger scaffolds must be 3 inches.
- Each end of a platform unless cleated or otherwise restrained by hooks or equivalent means, must extend over the centerline of its support at least 6 inches.
- Each end of a platform cannot extend over its support more than 12 inches, unless guardrails have been installed which would block employee access to the cantilevered end.
- On scaffolds where scaffold planks are abutted to create a long platform, each abutted end must rest on a separate support surface.
- On scaffolds where platforms are overlapped to create a long platform, the overlap must occur only over supports, and cannot be less than 12 inches unless the platforms are nailed together or otherwise restrained to prevent movement.
- At all points of a scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle shall be laid first, and platforms which rest at right angles over the same bearer shall be laid second, on top of the first platform.
- Wood platforms cannot be covered with opaque finishes, with the exception of platform edges which may be covered or marked for identification.
- Scaffold components manufactured by different manufacturers cannot be intermixed unless the components fit together without force and the scaffold's structural integrity is maintained by the user. Scaffold components manufactured by different manufacturers cannot be modified in order to intermix them unless a competent person determines the resulting scaffold is structurally sound.

## Specific Requirements

### Criteria for Supported Scaffolds:

- Supported scaffolds with a height to base width (including outrigger supports, if used) ratio of more than four to one (4:1) must be restrained from tipping by guying, tying, bracing, or equivalent means, as follows:
- Guys, ties, and braces must be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4:1 height and be repeated vertically at every 26 feet (20 feet for scaffolds less than 3 feet in width). The top guy, tie or brace of completed scaffolds shall be placed no further than the 4:1 height from the top. Guys, ties, and braces must be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet (measured from one end {not both} towards the other).
- Supported scaffold poles, legs, posts, frames, and uprights must bear on base plates. Base plates must rest on mudsills or other firm foundation and be plumb and braced to prevent swaying and displacement.
- Footings must be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement. Unstable objects cannot be used to support scaffolds or platform units.

### Criteria for Suspension Scaffolds:

- All suspension scaffold support devices must rest on surfaces capable of supporting at least four times the load imposed on them by the scaffold operating at the rated load of the hoist.
- Suspension scaffold outrigger beams must be made of structural metal or equivalent strength material and restrained to prevent movement.
- The inboard ends of suspension scaffold outrigger beams must be stabilized by bolts or other direct connections to the floor or roof deck, or stabilized by counterweights.
- Before the scaffold is used, direct connections must be evaluated by a competent person.
- Counterweights must be made of non-flow able material. Sand, gravel, and similar materials that can be easily dislocated cannot be used as counterweights.
- Only those items specifically designed as counterweights can be used to counterweight scaffold systems.
- Counterweights must be secured by mechanical means to the outrigger beams to prevent accidental displacement.
- Counterweights cannot be removed from an outrigger beam until the scaffold is disassembled.
- Outrigger beams which are not stabilized by bolts or other direct connections to the floor or roof deck must be secured by tiebacks.
- Tiebacks must be equivalent in strength to the suspension ropes.
- Outrigger beams must be placed perpendicular to the bearing support. Because of obstructions that cannot be moved, the outrigger beam may be placed at some other angle, providing opposing angle tiebacks are used.
- Tiebacks must be secured to a structurally sound anchorage on the building or structure. Sound anchorages include structural members, but do not include standpipes, vents, other piping systems, or electrical conduit.
- Tiebacks must be installed perpendicular to the face of the building or structure, or opposing angle tiebacks must be installed. Single tiebacks installed at an angle are prohibited.
- Suspension scaffold outrigger beams must be:
  - a. Provided with stop bolts or shackles at both ends.
  - b. Securely fastened together with the flanges turned out when channel iron beams are used in place of I-beams.
  - c. Installed with all bearing supports perpendicular to the beam center line.
  - d. Set and maintained with the web in a vertical position.
  - e. When an outrigger beam is used, the shackle or clevis with which the rope is attached to the outrigger beam must be placed directly over the center line of the stirrup.
- Suspension scaffold support devices such as cornice hooks, roof hooks, roof irons,



parapet clamps, or similar devices must be:

- a. Made of steel, wrought iron, or materials of equivalent strength.
  - b. Supported by bearing blocks.
  - c. Secured against movement by tiebacks installed at right angles to the face of the building or structure, or opposing angle tiebacks installed and secured to a structurally sound point of anchorage on the building or structure. Sound points of anchorage include structural members, but do not include stand pipes, vents, other piping systems, or electrical conduit.
- Tiebacks must be equivalent in strength to the hoisting rope.
  - When winding drum hoists are used on a suspension scaffold, they must contain not less than four wraps of the suspension rope at the lowest point of scaffold travel. When other types of hoists are used, the suspension ropes must be long enough to allow the scaffold to be lowered to the level below without the rope end passing through the hoist, or the rope end configured or provided with means to prevent the end from passing through the hoist.
  - The use of repaired wire rope as suspension rope is prohibited.
  - Wire suspension ropes shall not be joined together except through the use of eye splice thimbles connected with shackles or cover plates and bolts
  - The load end of wire suspension ropes shall be equipped with proper size thimbles and secured by eye splicing or equivalent means
  - Ropes must be inspected for defects by a competent person prior to each work shift and after every occurrence which could affect a rope's integrity.
    - a. Any physical damage which impairs the function and strength of the rope
    - b. Kinks that might impair the tracking or wrapping of rope around the drum(s) or sheave(s)
    - c. Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one lay
    - d. Abrasion, corrosion scrubbing, flattening or peening causing loss of more than one-third of the original diameter of the outside wires
    - e. Heat damage caused by a torch or any damage caused by contact with electrical wires
    - f. Evidence that the secondary brake has been activated during an over speed condition and has engaged the suspension rope
  - Swaged attachments or spliced eyes on wire suspension ropes shall not be used unless they are made by the wire rope manufacturer or a qualified person
  - When wire rope clips are used on suspension scaffolds
    - a. There shall be a minimum of three wire rope clips installed, with the clips a minimum of 6 rope diameters apart
    - b. Clips shall be installed according to the manufacturer's recommendations
    - c. Clips shall be retightened to the manufacturer's recommendations after the initial loading
    - d. Clips shall be inspected and retightened to the manufacturer's recommendations at the start of each work shift thereafter;
    - e. U-bolt clips shall not be used at the point of suspension for any scaffold hoist
    - f. When U-bolt clips are used, the U-bolt shall be placed over the dead end of the rope and the saddle shall be placed over the live end of the rope
  - Suspension scaffold power-operated hoists and manual hoists shall be tested by a qualified testing laboratory
  - Gasoline-powered equipment and hoists shall not be used on suspension scaffolds
  - Gears and brakes of power-operated hoists used on suspension scaffolds must be enclosed.
  - In addition to the normal operating brake, suspension scaffold power-operated hoists and manually operated hoists shall have a braking device or locking pawl which engages automatically when a hoist makes either of the following uncontrolled movements: an instantaneous change in momentum or an accelerated over speed
  - Manually operated hoists require a positive crank force to descend.
  - Two-point and multi-point suspension scaffolds must be tied or otherwise secured to prevent

them from swaying.

- Devices whose sole function is to provide emergency escape and rescue shall not be used as working platforms. This provision does not preclude the use of systems which are designed to function both as suspension scaffolds and emergency systems.
- Prior to welding activities on a suspension scaffold, it's recommended that the Safety Department be notified for specific requirements.

#### Single-point Adjustable Suspension Scaffolds:

- The supporting rope between the scaffold and the suspension device must be kept vertical unless all of the following conditions are met:
  - a. The rigging has been designed by a qualified person.
  - b. The scaffold is accessible to rescuers.
  - c. The supporting rope is protected to ensure that it will not chafe at any point where a change in direction occurs.
  - d. The scaffold is positioned so that swinging cannot bring the scaffold into contact with another surface.
- Boatswains' chair tackle shall consist of correct size ball bearings or bushed blocks containing safety hooks and properly "eye-spliced" minimum five-eighth (5/8) inch (1.6 cm) diameter first-grade manila rope, or other rope which will satisfy the criteria (e.g., strength and durability) of manila rope.
- Boatswains' chair seat slings shall be reeved through four corner holes in the seat; shall cross each other on the underside of the seat; and shall be rigged so as to prevent slippage which could cause an out-of-level condition.
- Boatswains' chair seat slings shall be a minimum of five-eighth (5/8) inch (1.6 cm) diameter fiber, synthetic, or other rope which will satisfy the criteria (e.g., strength, slip resistance, durability, etc.) of first grade manila rope
- When a heat-producing process such as gas or arc welding is being conducted, boatswains' chair seat slings must be a minimum of 3/8 inch wire rope.
- Non-cross-laminated wood boatswains' chairs must be reinforced on their underside by cleats securely fastened to prevent the board from splitting.

#### Two-point Adjustable Suspension Scaffolds (Swing Stages):

- When two or more scaffolds are used, they cannot be bridged one to another unless they are designed to be bridged, the bridge connections are articulated, and the hoists are properly sized.
- If bridges are not used, passage may be made from one platform to another only when the platforms are at the same height and are abutting.
- Scaffolds must be suspended from metal outriggers, brackets, wire rope slings, hooks, or means that meet equivalent criteria (e.g., strength, durability).

#### Tube and Coupler Scaffolds:

- When platforms are being moved to the next level, the existing platform must be left undisturbed until the new bearers have been set in place and braced prior to receiving the new platforms.
- Transverse bracing forming an "X" across the width of the scaffold must be installed on the scaffold ends and at a minimum of every third set of posts horizontally (measured only from one end) and every fourth runner vertically.
- On straight run scaffolds, longitudinal bracing across the inner and outer rows of posts must be installed diagonally in both directions and shall extend from the base of the scaffold at approximately a 45 degree angle. On scaffolds whose length is greater than their height, such bracing shall be repeated beginning at least at every fifth post. On scaffolds whose length is less than their height, such bracing shall be installed from the base of the end posts upward to the opposite end posts, and then in alternating directions until reaching the top of the scaffold.

Bracing shall be installed as close as possible to the intersection of the bearer and post or runner and post

- Bearers must extend beyond the posts and runners and provide full contact with the coupler.
- Runners must be interlocked on straight runs to form continuous lengths and be coupled to
- Runners must be installed along the length of the scaffold, located on both the inside and outside posts at level heights.
- Tube and coupler scaffolds over 125 feet in height must be designed by a registered professional engineer.

#### Fabricated Frame Scaffolds:

- When moving platforms to the next level, the existing platform must be left undisturbed until the new end frames have been set in place and braced prior to receiving the new platforms.
- Frames and panels must be braced by cross, horizontal, or diagonal braces, or combination thereof, to secure vertical members together laterally.
- Frames and platforms must be joined together vertically by coupling or stacking pins or equivalent means. Where uplift can occur which would displace scaffold end frames or platforms, the frames and platforms must be locked together vertically by pins or equivalent means.
- Brackets used to support cantilevered loads must:
  - a. Be seated with side-brackets parallel to the frames and end-brackets at 90 degrees to the frames.
  - b. Not be bent or twisted from these positions.
  - c. Be used only to support personnel, unless the scaffold has been designed for other loads by a qualified engineer and built to withstand the tipping forces caused by those other loads being placed on the bracket-supported section of the scaffold.
- Scaffolds over 125 feet in height above their base plates must be designed by a registered

#### Mobile Scaffolds:

- Scaffolds must be braced by cross, horizontal, or diagonal braces, or combination thereof, to prevent racking or collapse of the scaffold and to secure vertical members together laterally so as to automatically square and align the vertical members. Scaffolds must be plumb, level, and square. All brace connections must be secured.
- Scaffold casters and wheels must be locked with positive wheel and/or wheel and swivel locks, or equivalent means, to prevent movement of the scaffold while the scaffold is used in stationary manner.
- Manual force used to move the scaffold must be applied as close to the base as practicable, but not more than 5 feet above the supporting surface.
- Scaffolds must be stabilized to prevent tipping during movement.
- Scaffolds must be stabilized to prevent tipping during movement.
- Employees cannot be allowed to ride on scaffolds unless ALL of the following conditions exist:
  - a. The surface on which the scaffold is being moved is within 3 degrees of level and is free of pits, holes, and obstructions.
  - b. The height to base width ratio of the scaffold during movement is two to one (2:1) or Outrigger frames, when used, are installed on both sides of the scaffold.
  - d. No employee is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.
  - e. Before a scaffold is moved, each employee on the scaffold must be made aware of the move.
- Platforms cannot extend outward beyond the base supports of the scaffold unless outrigger frames or equivalent devices are used to ensure stability.
- Where leveling of the scaffold is necessary, screw jacks or equivalent means must be used.

- Caster stems and wheel stems must be pinned or otherwise secured in scaffold legs or adjustment screws.

Access:

- When scaffold platforms are more than 2 feet above or below a point of access, portable ladders, hook-on ladders, steps, stair towers (scaffold stairways/towers), stairway-type ladders (such as ladder stands), ramps, walkways, integral prefabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface must be used. **CROSS BRACES CANNOT BE USED AS A MEANS OF ACCESS.**
- Hook-on or attachable ladders and stair towers (scaffold stairway/towers) must be installed as soon as scaffold erection has progressed to a point that permits safe installation and use, and must be positioned so that their bottom rung or step is not more than 24 inches above the scaffold supporting level.
- Climbing of scaffolding requires rest platforms every 35 feet.
- A top rail and a mid-rail must be provided on each side of each scaffold stairway.
- Handrails must be at least 3 inches from other objects.
- Treads and landings must have slip-resistant surfaces.
- Guardrails must be provided on the open sides and ends of each landing.

General Use:

- Scaffolds and scaffold components must be inspected for visible defects by a competent person before each work shift and after any occurrence which could affect a scaffold’s structural integrity.
- Scaffolds and scaffold components cannot be loaded in excess of their maximum intended loads or rated capacities, whichever is less.
- The use of shore or lean-to scaffolds is prohibited.
- The clearance between scaffolds and power lines must be as follows:

**KEEP CLEAR OF OVERHEAD LINES**

<i><b>Insulated lines voltage</b></i>	<i><b>Minimum distance</b></i>
Less than 300 volts	3 feet (0.9M)
300 volts – 50 kv	10 feet
More than 50 kv	10 feet (3.1M) plus 0.4 inches for each 1 kv over 50 kv

<i><b>Un-insulated lines voltage</b></i>	<i><b>Minimum distance</b></i>
Less than 50 kv	10 feet (3.1M)
More than 50 kv	10 feet (3.1M) plus 0.4 inches for each 1 kv over 50 kv

**Notify the power company for safe working distance for voltage over 750,000**

- Scaffolds must be erected, moved, dismantled, or altered only under the supervision and direction of a competent person.
- Employees must be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials. Debris cannot be allowed to accumulate on the scaffold.
- Where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines, or equivalent measures to control the loads must be used.

- Suspension ropes must be shielded from heat-producing processes. When acids or other corrosive substances are used on a scaffold, the ropes must be shielded, treated to protect against the corrosive substances, or must be of a material that will not be damaged by the substance being used.
- Work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on the scaffold.
- Makeshift devices such as, but not limited to, boxes and barrels shall not be used on top of scaffold platforms to increase the working level height of employees.
- Ladders cannot be used on scaffolds to increase the working level height of employees, except on large area scaffolds where employers have satisfied the following criteria:
  - a. When the ladder is placed against a structure which is not a part of the scaffold, the scaffold must be secured against the sideways thrust exerted by the ladder.
  - b. The platform must be secured to the scaffold to prevent its movement.
  - c. The ladder legs must be on the same platform or other means provided to stabilize the ladder against unequal platform deflection.
  - d. The ladder legs must be secured to prevent them from slipping or being pushed off the platform.
- Scaffolding equipped with weather enclosure (e.g., visqueen) is to have ties located every other frame up the scaffold and along the scaffold run.
- To reduce the possibility of welding current arcing through the suspension wire rope when performing welding from suspended scaffolds, the following precautions shall be taken, as applicable:
  - a. An insulated thimble shall be used to attach each suspension wire rope to its hanging support (such as cornice hook or outrigger). Excess suspension wire rope and any additional independent lines from grounding shall be insulated;
  - b. The suspension wire rope shall be covered with insulating material extending at least 4 feet (1.2 m) above the hoist. If there is a tail line below the hoist, it shall be insulated to prevent contact with the platform. The portion of the tail line that hangs free below the scaffold shall be guided or retained, or both, so that it does not become grounded;
  - c. Each hoist shall be covered with insulated protective covers;
  - d. In addition to a work lead attachment required by the welding process, a grounding conductor shall be connected from the scaffold to the structure. The size of this conductor shall be at least the size of the welding process work lead, and this conductor shall not be in series with the welding process or the work piece;
  - e. If the scaffold grounding lead is disconnected at any time, the welding machine shall be shut off; and
  - f. An active welding rod or uninsulated welding lead shall not be allowed to contact the scaffold or its suspension system.

#### Fall Protection:

- Each employee on a scaffold 6 feet or more above a lower level must be protected from falling to that lower level.
- Each employee on a boatswains' chair must be protected by a personal fall arrest system.
- Each employee performing overhand bricklaying operations from a supported scaffold must be protected from falling from all open sides and ends of the scaffold (except at the side next to the wall being laid) by the use of a personal fall arrest system or guardrail system.
- Personal fall arrest systems used on scaffolds shall be attached by lanyard to a vertical lifeline, horizontal lifeline, or scaffold structural member. Vertical lifelines shall not be used when overhead components, such as overhead protection or additional platform levels, are part of a single-point or two-point adjustable suspension scaffold.

- When vertical lifelines are used, they shall be fastened to a fixed safe point of anchorage, shall be independent of the scaffold, and shall be protected from sharp edges and abrasion. Safe points of anchorage include structural members of buildings, but do not include standpipes, vents, other piping systems, electrical conduit, outrigger beams, or counterweights.
- When horizontal lifelines are used, they shall be secured to two or more structural members of the scaffold, or they may be looped around both suspension and independent suspension lines (on scaffolds so equipped) above the hoist and brake attached to the end of the scaffold. Horizontal lifelines shall not be attached only to the suspension ropes.
- When lanyards are connected to horizontal lifelines or structural members on a single-point or two-point adjustable suspension scaffold, the scaffold shall be equipped with additional independent support lines and automatic locking devices capable of stopping the fall of the scaffold in the event one or both of the suspension ropes fail. The independent support lines shall be equal in number and strength to the suspension ropes.
- Vertical lifelines, independent support lines, and suspension ropes shall not be attached to each other, nor shall they be attached to or use the same point of anchorage, nor shall they be attached to the same point on the scaffold or personal fall arrest system.
- Guardrails systems must be installed along all open sides and ends of platforms and be a minimum of 200 lb. capacity. Top rail is to be 39 to 45 inches in height from the platform surface. Mid-rail is to be located midway between the top edge of the guardrail system and the platform surface.
- Cross bracing will not be acceptable for use as guardrails.

#### Falling Object Protection:

- Employees exposed to overhead hazards must be provided with additional protection from falling hand tools, debris, and other small objects through the installation of toe boards, screens, or guardrail systems.
- Where there is a danger of tools, materials, or equipment falling from a scaffold and striking employees below, the following provisions apply:
  - a. The area below the scaffold to which objects can fall must be barricaded, and employees cannot be permitted to enter the hazard area
  - b. A toe board must be erected along the edge of platforms 6 feet or more above lower levels for a distance sufficient to protect employees below.
- Where tools, materials, or equipment is piled to a height higher than the top edge of the toe board:
  - a. Paneling or screening extending from the toe board or platform to the top of the guardrail must be erected for a distance sufficient to protect employees below.
  - b. A guardrail system must be installed with openings small enough to prevent passage of potential falling objects
  - c. A canopy structure, debris net, or catch platform strong enough to withstand the impact forces of the potential falling objects must be erected over the employees below.
- Where used, toe boards must be:
  - a. Capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction at any point along the toe board.
  - b. At least 3-1/2 inches high from the top edge of the toe board to the level of the walking/working surface. Toe boards must be securely fastened in place at the outermost edge of the platform and have not more than 1/4 inch clearance above the walking/working surfaced. Toe boards must be solid or with openings not over one inch in the greatest dimension.

### Training Requirements:

- The employer must have each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a competent person to recognize and eliminate/mitigate any potential hazards associated with the work in question.
- The employer will have each employee who performs work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards.
- Training program will include at least fall protection hazards, electrical safety, falling object protection, scaffold use, and its load capacity.

### Re-Training:

Employees must be re-trained under the following scenarios:

- Changes in worksite conditions creates a new hazard not covered in the training.
- A change in the equipment (e.g. scaffold, fall protection, falling object protection) creates a new hazard not covered in the training.
- The employee demonstrates they have not retained requisite proficiency in required safe work practices.

### Scaffold Tagging Procedure:

- A competent person will inspect the scaffolds before use and tagged according to this procedure to ensure scaffolds are not used in unsafe conditions.
- The scaffold tagging procedure is designed to ensure the safe use of all scaffolds and prohibit the use of scaffolds that are dangerous and do not meet manufacturer specifications and federal, state, and local codes.
- Scaffolds that are ready for employee use must be tagged with either a green or a yellow tag.
- A green scaffold tag (Exhibit A) designates that the scaffold is complete as defined by OSHA and the manufacturer. Scaffolds must be erected to meet the requirements of a green tagged scaffold whenever possible.
- A yellow scaffold tag (Exhibit B) designates a scaffold which is not complete. This scaffold may have been altered to accommodate a specific job and, with proper protection, may be used safely. A yellow scaffold tag must state the reason the scaffold is incomplete and what precautions must be taken.
- A red scaffold tag (Exhibit C) designates an unsafe scaffold. A scaffold which is in the process of being erected, changed, or dismantled must be red tagged. Conducting work on a red tag scaffold is prohibited. The only employees permitted on a red tag scaffold are the scaffold erection crew.
- A scaffold without a tag must be considered a red tag scaffold.
- If a scaffold has been damaged or is defective, a red scaffold tag must be attached to the scaffold and a "CAUTION--DO NOT USE" tag attached to the defective item. After a scaffold is repaired, the scaffold must be re-inspected and tagged accordingly.
- The scaffold erection crew, foreman, or safety representative must determine which tag is applicable and ensure the tag is completed and affixed to the scaffold.
- The scaffold tag must be attached to each scaffold access at eye level (approximately 5' to 6') from the base of the scaffold or scaffold access level.
- Inspections must be performed periodically to ensure all tags are legible and are in good condition and that the attached tag still applies.
- Employees using the scaffold must be familiar with the tagging system. Visually inspect the scaffold for defects. If defects are noticed, remove the tag and notify your supervisor. Do not use the scaffold until all defects are eliminated.
- There are to be no modifications made to any scaffold except those made by the designated scaffold crew. The tag is to be changed as required.

## DEFINITIONS

BEARER (putlog): A horizontal transverse scaffold member (which may be supported by ledgers or runners) upon which the scaffold platform rests and which joins scaffold uprights, posts, poles, and similar members.

BOATSWAINS' CHAIR: A single-point adjustable suspension scaffold consisting of a seat or sling designed to support one employee in a sitting position.

BODY HARNESS: A design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with means for attaching it to other components of a personal fall arrest system.

BRACE: A rigid connection that holds one scaffold member in a fixed position with respect to another member, or to a building or structure.

CLEAT: A structural block used at the end of a platform to prevent the platform from slipping off its supports. Cleats are also used to provide footing on sloped surfaces such as crawling boards.

COMPETENT PERSON: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them.

COUPLER: A device for locking together the tubes of a tube and coupler scaffold.

DECELERATION DEVICE: Any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyard, or automatic self-retracting lifeline lanyard, which dissipates a substantial amount of energy imposed on an employee during fall arrest.

EQUIVALENT: Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials, or designs specified in the standard.

EXPOSED POWER LINES: Electrical power lines which are accessible to employees and which are not shielded from contact. Such lines do not include extension cords or power tool cords.

EYE or EYE SPLICE: A loop with or without a thimble at the end of a wire rope.

FABRICATED DECKING AND PLANKING: Manufactured platforms made of wood (including laminated wood and solid sawn wood planks), metal, or other materials.

FABRICATED FRAME SCAFFOLD (tubular welded frame scaffold): A scaffold consisting of a platform(s) supported on fabricated end frames with integral posts, horizontal bearers, and intermediate members.

FAILURE: Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.



**GUARDRAIL SYSTEM:** A vertical barrier, consisting of, but not limited to, top rails, mid rails, and posts, erected to prevent employees from falling off a scaffold platform or walkway to lower levels.

**HOIST:** A manual or power-operated mechanical device to raise or lower a suspended scaffold.

**LANDING:** A platform at the end of a flight of stairs.

**LEAN-TO-SCAFFOLD:** A supported scaffold which is kept erect by tilting it toward and resting it against a building or structure.

**LIFELINE:** A component consisting of a flexible line that connects to an anchorage at one end to hang vertically (vertical lifeline), or that connects to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

**LOWER LEVELS:** Areas below the level where the employee is located and to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, and equipment.

**MAXIMUM INTENDED LOAD:** The total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

**MOBILE SCAFFOLD:** A powered or unpowered, portable, caster, or wheel-mounted supported scaffold.

**MULTI-LEVEL SUSPENDED SCAFFOLD:** A two-point or multi-point adjustable suspension scaffold with a series of platforms at various levels resting on common stirrups.

**MULTI-POINT ADJUSTABLE SUSPENSION SCAFFOLD:** A suspension scaffold consisting of a platform(s) which is suspended by more than two ropes from overhead supports and equipped with means to raise and lower the platform to desired work levels. Such scaffolds include chimney hoists.

**OPEN SIDES AND ENDS:** The edges of a platform that are more than 14 inches away horizontally from a sturdy, continuous, vertical surface (such as a building wall) or a sturdy, continuous, horizontal surface (such as a floor), or a point of access.

**OUTRIGGER:** The structural member of a supported member of a supported scaffold used to increase the base width of a scaffold in order to provide support for and increased stability of the scaffold.

**OUTRIGGER BEAM (thrust out):** The structural member of a suspension scaffold or outrigger scaffold which provides support for the scaffold by extending the scaffold point of attachment to a point out and away from the structure or building.

**OVERHAND BRICKLAYING:** The process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. It includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

**PERSONAL FALL ARREST SYSTEM:** A system used to arrest an employee's fall. It consists of an anchorage, connectors, and body harness, and may include a lanyard, deceleration device, lifeline, or combination of these.

**PLATFORM:** A work surface elevated above work levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

**POWER OPERATED HOIST:** A hoist which is powered by other than human energy.

**QUALIFIED:** One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems related to the subject matter, the work, or the project.

**RATED LOAD:** The manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold component.

**RUNNER (ledger or ribbon):** The lengthwise horizontal spacing or bracing member which may support the bearers.

**SCAFFOLD:** Any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage), used for supporting employees or materials or both.

**SHORE SCAFFOLD:** A supported scaffold which is placed against a building or structure and held in place with props.

**SINGLE-POINT ADJUSTABLE SUSPENSION SCAFFOLD:** A suspension scaffold consisting of a platform suspended by one rope from an overhead support and equipped with means to permit the movement of the platform to desired work levels.

**STAIR TOWER (scaffold stairway/tower):** A tower comprised of scaffold components and which contains internal stairway units and rest platforms. These towers are used to provide access to scaffold platforms and other elevated points such as floors and roofs.

**STALL LOAD:** The load at which the prime-mover of a power-operated hoist stalls or the power to the prime-mover is automatically disconnected.

**STEP, PLATFORM, AND TRESTLE LADDER SCAFFOLD:** A platform resting directly on the rungs of step ladders or trestle ladders.

**SUPPORTED SCAFFOLD:** One or more platforms supported by outrigger beams, brackets, poles, legs, uprights, posts, frames, or similar rigid support.

**SUSPENSION SCAFFOLD:** One or more platforms suspended by ropes or other non-rigid means from an overhead structure(s).

**SYSTEM SCAFFOLD:** A scaffold consisting of posts with fixed connection points that accept runners, bearers, and diagonals that can be interconnected at predetermined levels.

TUBE AND COUPLER SCAFFOLD: A supported or suspended scaffold consisting of a platform(s) supported by tubing, erected with coupling devices connecting uprights, braces, bearers, and runners.

TUBULAR WELDED FRAME SCAFFOLD: (See "FABRICATED FRAME SCAFFOLD")

TWO-POINT SUSPENSION SCAFFOLD (swing stage): A suspension scaffold consisting of a platform supported by hangers (stirrups) suspended by two ropes from overhead supports and equipped with means to permit the raising and lowering of the platform to desired work levels.

UNSTABLE OBJECTS: Items whose strength, configuration, or lack of stability may allow them to become dislocated and shift and therefore may not properly support the loads imposed on them. Unstable objects do not constitute a safe base support for scaffolds, platforms, or employees. Examples include, but are not limited to, barrels, boxes, loose brick, and concrete blocks.

WALKWAY: A portion of a scaffold platform used only for access and not as a work level.



**Safety Program**

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

## **Stairways and Ladders**

### **General**

A stairway or ladder must be provided at all worker points of access where there is a break in elevation of 19 inches (48cm) or more and no ramp, runway, embankment, or personnel hoist is provided.

When there is only one point of access between levels, it must be kept clear to permit free passage by workers. If free passage becomes restricted, a second point of access must be provided and used.

When there are more than two points of access between levels, at least one point of access must be kept clear.

All stairway and ladder fall protection systems required by these rules must be installed and all duties required by the stairway and ladder rules must be performed before employees begin work that requires them to use stairways or ladders and their respective fall protection systems.

### **Stairways**

Stairways that will not be a permanent part of the structure on which construction work is performed must have landings at least 30 inches deep and 22 inches wide (76 x 56 cm) at every 12 feet (3.7m) or less of vertical rise.

Stairways must be installed at least 30 degrees, and no more than 50 degrees, from the horizontal.

Variations in riser height or stair tread depth must not exceed 1/4 inch in any stairway system, including any foundation structure used as one or more treads of the stairs.

Where doors or gates open directly onto a stairway, a platform must be provided that extends at least 20 inches (51 cm) beyond the swing of the door.

Metal pan landings and metal pan treads must be secured in place before filling.

All stairway parts must be free of dangerous projections such as protruding nails.

Slippery conditions on stairways must be corrected before the stairs are used to reach other levels.

Spiral stairways that will not be a permanent part of the structure may not be used by workers.

Except during construction of the actual stairway, stairways with metal pan landings and treads must not be used where the treads and/or landings have not been filled in with concrete or other material, unless the pans of the stairs and/or landings are temporarily filled in with wood or other material. All treads and landings must be replaced when worn below the top edge of the pan. Except during construction of the actual stairway, skeleton metal-frame structures and steps must not be used (where

treads and/or landings are to be installed at a later date), unless the stairs are fitted with secured temporary treads and landings. Temporary treads must be made of wood or other solid material and installed the full width and depth of the stair.

### **Stairrails And Handrails**

Stairways having four or more risers or rising more than 30 inches (76 cm) in height, whichever is less, must have at least one handrail. A stair rail also must be installed along each unprotected side or edge. When the top edge of a stair rail system also serves as a handrail, the height of the top edge must not be more than 37 inches (94 cm) nor less than 36 inches (91.5 cm) from the upper surface of the stair rail to the surface of the tread. Winding or spiral stairways must be equipped with a handrail to prevent using areas where the tread width is less than 6 inches (15 cm). Stair rails installed after March 15, 1991 must not be less than 36 inches (91.5 cm) in height.

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be provided between the top rail and stairway steps of the stair rail system. Midrails, when used, must be located midway between the top of the stair rail system and the stairway steps. Screens or mesh, when used, must extend from the top rail to the stairway step and along the opening between top rail supports.

Intermediate vertical members, such as balusters, when used, must not be more than 19 inches (48 cm) apart.

Other intermediate structural members, when used, must be installed so that there are no openings of more than 19 inches (48 cm) wide. Handrails and the top rails of the stair rail systems must be capable of withstanding, without failure, at least 200 pounds of weight applied within 2 inches (5 cm) of the top edge in any downward or outward direction, at any point along the top edge. The height of handrails must not be more than 37 inches (94 cm) nor less than 30 inches (76 cm) from the upper surface of the handrail to the surface of the tread.

The height of the top edge of a stair rail system used as a handrail must not be more than 37 inches (94 cm) nor less than 36 inches (91.5 cm) from the upper surface of the stair rail system to the surface of the tread.

Stair rail systems and handrails must be surfaced to prevent injuries from punctures or lacerations and to keep clothing from snagging.

Handrails must provide an adequate handhold for employees to grasp to prevent falls.

The ends of stair rail systems and handrails must be constructed to prevent dangerous projections, such as rails protruding beyond the end posts of the system.

Temporary handrails must have a minimum clearance of 3 inches (8 cm) between the handrail and walls, stair rail systems, and other objects.

Unprotected sides and edges of stairway landings must be provided with standard 42-inch (1.1 m) guardrail systems.

### **Ladders**

A double-cleated ladder or two or more ladders must be provided when ladders are the only way to enter or exit a work area for 25 or more employees, or when a ladder serves simultaneous two-way traffic.

Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced when the ladder is in position for use.

Rungs, cleats, and steps of portable and fixed ladders (except as provided below) must not be spaced less than 10 inches (25 cm) apart, nor more than 14 inches (36 cm) apart, along the ladder's side rails.

Rungs, cleats, and steps of step stools must not be less than 8 inches (20 cm) neither apart, nor more than 12 inches (31 cm) apart, between centers lines of the rungs, cleats, and steps.

Rungs, cleats, and steps at the base section of extension trestle ladders must not be less than 8 inches (20 cm) nor more than 18 inches (46 cm) apart, between center lines of the rungs, cleats, and steps. The rung spacing on the extension section must not be less than 6 inches (15 cm) nor more than 12 inches (31 cm).

Ladders must not be tied or fastened together to create longer sections unless they are specifically designed for such use.

A metal spreader or locking device must be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.

When splicing side rails, the resulting side rail must be equivalent in strength to a one-piece side rail made of the same material.

Two or more separate ladders used to reach an elevated work area must be offset with a platform or landing between the ladders, except when portable ladders are used to gain access to fixed ladders.

Ladder components must be surfaced to prevent injury from punctures or lacerations and to prevent snagging of clothing.

Wood ladders must not be coated with any opaque covering, except for identification or warning labels which may be placed only on one face of a side rail.

### **Portable Ladders**

Non-self-supporting and self-supporting portable ladders must support at least four times the maximum intended load; extra-heavy-duty type 1A metal or plastic ladders must sustain 3.3 times the maximum intended load. The ability of a self-supporting ladder to sustain loads must be determined by applying the load to the ladder in a downward vertical direction. The ability of a non-self-supporting ladder to sustain loads must be determined by applying the load to the ladder in a downward vertical direction. The ability of a non-self-supporting ladder to sustain loads must be determined by applying the load in a downward vertical direction when the ladder is placed at a horizontal angle of 75-1/2 degrees. The minimum clear distance between side rails for all portable ladders must be 11-1/2 inches (29 cm).

The rungs and steps of portable metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping.

### **Ladder Usage**

When portable ladders are used for access to an upper landing surface, the side rails must extend at least 3 feet (.9 m) above the upper landing surface. The ladder must be secured, and a grasping device, such as a grab rail, must be provided to assist workers in mounting and dismounting the ladder. A ladder extension must not deflect under a load that would cause the ladder to slip off its support. Ladders must be maintained free of oil, grease, and other slipping hazards.

Ladders must not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer's rated capacity.

Ladders must be used only for the purpose for which they were designed.

Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder. Wood job-made ladders with spliced side rails must be used at an angle where the horizontal distance is one-eighth the working length of the ladder.

Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the back side of the ladder. Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.

Ladders must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.

Ladders placed in areas such as passageways, doorways, or driveways where they can be displaced by workplace activities or traffic must be secured to prevent accidental movement, or a barricade must be used to keep traffic or activities away from the ladder.

The area around the top and bottom of the ladders must be kept clear.

The top of a non-self-supporting ladder must be placed with two rails supported equally unless the ladder is equipped with a single support attachment.

Ladders must not be moved, shifted, or extended while in use.

Ladders must have nonconductive side rails if they are used where the worker or the ladder could contact exposed, energized electrical equipment. The top and the top step of a stepladder must not be used as a step.

Cross-bracing on the rear section of stepladders must not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use.

Single-rail ladders must not be used.

When ascending or descending a ladder, the worker must face the ladder.

Each worker must use at least one hand to grasp the ladder when moving up or down the ladder.

A worker on a ladder must not carry any object or load that could cause the worker to lose balance and fall.

### **Structural Defects**

Portable ladders with structural defects, such as broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components, must immediately be marked defective, or tagged with "Do Not Use" or similar language, and must be withdrawn from service until repaired. Fixed ladders with structural defects, such as broken or missing rungs, cleats, or steps, broken or split rails, or corroded components, must be withdrawn from service until repaired.

Defective fixed ladders are considered withdrawn from use when they are (a) immediately tagged with "Do Not Use" or similar language, (b) marked in a manner that identifies them as defective, or (c) blocked (such as with a plywood attachment that spans several rungs).

Ladder repairs must restore the ladder to a condition meeting its original design criteria before the ladder is returned to use.

### **Training**

Under the provisions of the standard, employers must provide a training program for each employee using ladders and stairways. The program must enable each employee to recognize hazards related to ladders and stairways and to use proper procedures to minimize these hazards. For example, employers must ensure that each employee is trained by a competent person in the following areas, as applicable:

- The nature of fall hazards in the work area
- The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used
- The proper construction, use, placement, and care in handling of all stairways and ladders
- The maximum intended load-carrying capacities of ladders used



## Steel Erection

### Purpose

It is the intent of The Boldt Company to protect employees from the hazards associated with steel erection activities during the construction, alteration, and/or repair of single and multi-story buildings, bridges, and other structures where steel erection occurs.

### Scope

Steel erection activities include hoisting, laying out, placing, connecting, welding, burning, guying, bracing, bolting, plumbing and rigging structural steel, steel joists and metal buildings; installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron and similar materials; and moving point-to-point while performing these activities.

The following activities are also covered when they occur during and are a part of steel erection activities:

Rigging, hoisting, laying out, placing, connecting, guying, bracing, dismantling, burning, welding, bolting, grinding, sealing, caulking, and all related activities for construction, alteration and/or repair of materials and assemblies such as structural steel; ferrous metals and alloys; non-ferrous metals and alloys; glass; plastics and synthetic composite materials; structural metal framing and related bracing and assemblies; anchoring devices; structural cabling; cable stays; permanent and temporary bents and towers; false work for temporary supports of permanent steel members; stone and other non-precast concrete architectural materials mounted on steel frames; safety systems for steel erection; steel and metal joists; metal decking and raceway systems and accessories; metal roofing and accessories; metal siding; bridge flooring; cold formed steel framing; elevator beams; grillage; shelf racks; multi-purpose supports; crane rails and accessories; miscellaneous, architectural and ornamental metals and metal work; ladders; railings; handrails; fences and gates; gratings; trench covers; floor plates; castings; sheet metal fabrications; metal panels and panel wall systems; louvers; column covers; enclosures and pockets; stairs; perforated metals; ornamental iron work, expansion control including bridge expansion joint assemblies; slide bearings; hydraulic structures; fascia's; soffit panels; penthouse enclosures; skylights; joint fillers; gaskets; sealants and seals; doors; windows; hardware; detention/security equipment and doors, windows and hardware; conveying systems; building specialties; building equipment; machinery and plant equipment, furnishings and special construction.

### Site Layout, Erection And Construction Sequence Plan

Before authorizing the commencement of steel erection, the controlling contractor must ensure that the steel erector is provided with the following written notifications:

- The concrete in the footings, piers and walls and the mortar in the masonry piers and walls have attained, on the basis of an appropriate American Society for Testing Materials (ASTM) standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.
- Any repairs, replacements and modifications to the anchor bolts were completed after attaining approval of the project structural engineer of record.

The controlling contractor must ensure that the following is provided and maintained:

- Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control. Exception: this requirement does not apply to roads outside of the construction site.
- A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

All overhead hoisting operations in steel erection must be pre-planned/predetermined.

Boldt allows the use of multiple-life rigging (Christmas-treeing) with preapproval from the Safety Dept. Boldt performs multiple lifts in accordance with the following procedures:

- a. Only a manufactured rigging system will be used.
- b. There will only be a maximum of 3 members hoisted per lift. All members being hoisted must be of similar size and weight, and be rigged at least 7 feet apart. The lowering of the load must be controlled when located over connectors.

The total load shall not exceed the rated capacity of the hoisting equipment specified in the hoisting equipment load charts. All employees engaged in the multiple lift will be trained in these procedures.

If necessary, due to conditions specific to the site, an alternate means and/or method(s) providing similar employee protection may be utilized. This site-specific erection plan must be developed by a qualified person and be available at the work site.

### **Hoisting And Rigging**

A competent person prior to each shift must visually inspect cranes being used in steel erection activities. The inspection must include observation for deficiencies during operation (Boldt's Crane Inspection Reports located in the Crane/Rigging/Signaling Operations Policy and Procedure).

- If any deficiency is identified, the competent person must make an immediate determination as to whether the deficiency constitutes a hazard.
- If the deficiency is determined to constitute a hazard, the hoisting equipment will be removed from service until the deficiency has been corrected.
- The operator is responsible for those operations under their direct control.

Whenever there is any doubt as to safety, the operator has the authority to stop and refuse to handle loads until safety has been assured.

A qualified rigger (a rigger who is also a qualified person) must inspect the rigging prior to each shift. The headache ball, hook or load cannot be used to transport personnel. The exception being when all the provisions are met for the use of a suspended personnel platform (basket).

Safety latches on hooks cannot be deactivated or made inoperable except:

- When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so.
- When equivalent protection is provided in a site-specific erection plan.

Routes for suspended loads must be pre-planned to ensure that no employee is required to work directly below a suspended load except for:

- Employees engaged in the initial connection of the steel.
- Employees necessary for the hooking or unhooking of the load.

When working under suspended loads, the following criteria must be met:

- Materials being hoisted must be rigged to prevent unintentional displacement;
- Hooks with self-closing safety latches or their equivalent must be used to prevent components from slipping out of the hook
- A qualified rigger must rig all loads.

Multiple-lift rigging, although permissible by OSHA (if the criteria is met), is not an accepted practice by Boldt and therefore cannot be performed.

### **Structural Steel Assembly**

Structural stability must be maintained at all times during the erection process.

The following additional requirements apply for multi-story structures:

- The permanent floors must be installed as the erection of structural member's progresses, and there cannot be not more than eight stories between the erection floor and the upper-most permanent floor, except where the structural integrity is maintained as a result of the design.
- At no time can there be more than four floors or 48 feet, whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design.
- A fully planked or decked floor or nets must be maintained within two stories or 30 feet; whichever is less, directly under any erection work being performed.

The following items apply to all walking/working surfaces:

- Due to the potential of tripping hazards, shear connectors (such as headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors or threaded studs cannot be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.
- Also due to trip hazards, when shear connectors are used in the construction of composite floors, roofs and bridge decks, employees must lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a working platform. Shear connectors cannot be installed from within a controlled decking zone (CDZ).

When deemed necessary by a competent person, plumbing-up equipment must be installed in conjunction with the steel erection process to ensure the stability of the structure.

- When used, plumbing-up equipment must be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.
- Plumbing-up equipment cannot be removed until approved by the competent person.

When hoisting, landing and placing metal decking bundles, the following applies:

- Bundle packaging and strapping cannot be used for hoisting unless specifically designed for that purpose.
- If loose items such as debris, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items must be secured to the bundles.
- Bundles of metal decking cannot be placed on joists until bridging has been installed, anchored and bearing ends attached. The exception being if all of the following conditions are met:
  - a. A qualified person has determined and documented in a site-specific erection plan that the structure or portion of structure is capable of supporting the load.
  - b. The bundle of decking is placed on a minimum of three steel joists.
  - c. The joists supporting the bundle of decking are attached at both ends.

- d. At least one row of bridging is installed and anchored.
  - e. Placement of the bundle of decking must be within one foot of the bearing surface of the joist end.
- Metal decking bundles must be landed on framing members so that enough support is provided to allow the bundles to be unbranded without dislodging the bundles from the supports.
  - At the end of the shift or when environmental or jobsite conditions require, metal decking must be secured against displacement.

Metal decking must be laid tightly and immediately secured upon placement to prevent accidental movement or displacement (no more than 3,000 sq. ft. unsecured at any given time). During initial placement, metal-decking panels must be placed to ensure full support by structural members.

Metal decking at roof and floor holes and openings must be installed as follows:

- Framed metal deck openings are to have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.
- Roof and floor holes and openings must be decked over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stairwells, etc.) employees must be protected from a potential fall(s).
- Metal decking holes and openings must not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use or is immediately covered.

Covers for roof and floor openings must meet the following requirements:

- Covers must be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.
- All covers must be secured when installed to prevent accidental displacement by the wind, equipment or employees.
- All covers must be painted/marked with high-visibility material with the word "HOLE" or "COVER" to provide warning of the hazard.
- Smoke dome or skylight fixtures that have been installed are not considered covers unless they meet the necessary strength requirements.

Decking gaps around columns must be covered with material of sufficient strength such as wire mesh, plywood, or equivalent to prevent personnel and objects from falling through.

Derrick floors must be fully decked and/or planked and the steel member connections completed to support the intended floor loading. Temporary loads placed on a derrick floor must be distributed over the underlying support members so as to prevent local overloading of the deck material.

### **Column Anchorage**

All columns must be anchored by a minimum of 4 anchor rods (anchor bolts).

Each column anchor rod (anchor bolt) assembly, including the column-to-base plate weld and the column foundation, must be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft.

Columns must be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs that are adequate to transfer the construction loads.

All columns must be evaluated by a competent person to determine whether guying or bracing is necessary. If guying or bracing is necessary, it must be installed.

Prior to the erection of a column, the controlling contractor must provide written notification to the steel erector if there has been any repair, replacement or modification of the anchor rods (anchor bolts) of that column. The project structural engineer of record must have approved this action(s).

When installing beams and columns, the following applies:

- During the final placing of solid web structural members, the load must not be released from the hoisting line until the members are secured with at least two bolts per connection, of the same size and strength as shown in the erection drawings, drawn up wrench-tight or the equivalent as specified by the project structural engineer of record. The exception being diagonal bracing. This requires at least one bolt per connection installed in the same manner as indicated above.
- To ensure the stability of cantilevered members, a competent person must determine if additional bolts are necessary (more than two bolts) and installed as needed.

For double connections at columns and/or at beam webs over columns the following applies:

- When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench-tight nut must remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced.
- If a seat or equivalent device is used, the seat (or device) must be designed to support the load during the double connection process. It must be adequately bolted or welded to both a supporting member and the first member before the nuts on the shared bolts are removed to make the double connection. Each column splice must be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft.

***Perimeter columns cannot be erected unless:***

- The perimeter columns extend a minimum of 48 inches above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructability does not allow.
- The perimeter columns have holes or other devices in or attached to perimeter columns at 42- 45 inches above the finished floor and the midpoint between the finished floor and the top cable to permit installation of perimeter safety cables except where constructability does not allow.

**Open Web Steel Joists**

Where steel joists are used and columns are not framed in at least two directions with solid web structural steel members, a steel joist must be field-bolted at the column to provide lateral stability to the column during erection. For the installation of this joist:

- A vertical stabilizer plate must be provided on each column for steel joists. The plate must be a minimum of 6 inch by 6 inch and extend at least 3 inches below the bottom chord of the joist with a 13/16-inch hole to provide an attachment point for guying or plumbing cables.
- The bottom chords of steel joists at columns must be stabilized to prevent rotation during erection.
- Hoisting cables must not be released until the seat at each end of the steel joist is field-bolted, and each end of the bottom chord is restrained by the column stabilizer plate.

If constructability does not allow a steel joist to be installed at the column:

- An alternate means of stabilizing joists must be installed on both sides near the column and:
  - a. Provide equivalent stability as defined above
  - b. Be designed by a qualified person
  - c. Be shop installed

- d. Be included in the erection drawings
- Hoisting cables cannot be released until the seat at each end of the steel joist is field-bolted and the joist is stabilized.

Where steel joists at or near columns span 60 feet or less, the joist must be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging.

Where steel joists at or near columns span more than 60 feet, the joists must be set in tandem with all bridging installed unless an alternative method of erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site-specific erection plan.

A steel joist or steel joist girder cannot be placed on any support structure unless such structure is stabilized. When steel joist(s) are landed on a structure, it must be secured to prevent unintentional displacement prior to installation. No modification that affects the strength of a steel joist or steel joist girder can be made without the approval of the project structural engineer of record.

In regards to field-bolted joists, the following applies:

- Except for steel joists that have been pre-assembled into panels, connections of individual steel joists to steel structures in bays of 40 feet or more must be fabricated to allow for field bolting during erection.
- These connections must be field-bolted unless constructability does not allow. Steel joists and steel joist girders cannot be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a qualified person. A bridging terminus point must be established before bridging is installed.

During the attachment of steel joists and girders, the following applies:

- Each end of "K" series steel joists must be attached to the support structure with a minimum of two-inch fillet welds one inch long or with two ½ inch bolts, or the equivalent.
- Each end of "LH" and "DLH" series steel joists and steel joist girders must be attached to the support structure with a minimum of two ¼ inch fillet welds two inches long, or with two ¾ inch bolts, or the equivalent.
  - a. Panels that have been pre-assembled from steel joists with bridging must be attached to the structure at each corner before the hoisting cables are released.
  - b. If not otherwise attached, each steel joist must be attached to the support structure, at least at one end on both sides of the seat, immediately upon placement in the final erection position and before additional joists are placed.

During the erection of steel joists, the following applies:

- Both sides of the seat of one end of each steel joist that requires bridging under must be attached to the support structure before hoisting cables are released.
- On steel joists that do not require erection bridging, only one employee shall be allowed on the joist until all bridging is installed and anchored.
- When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability.

During the erection of bridging, the following applies:

- When sections are less than 60 feet in length:
  - a. A row of bolted diagonal erection bridging must be installed near the mid-span of the steel joist.
  - b. Hoisting cables cannot be released until this bolted diagonal erection bridging is installed and anchored

- c. No more than one employee is allowed on these spans until all other bridging is installed and anchored.
- Where the span of the steel joist is over 60 feet through 100 feet:
  - a. All rows of bridging must be bolted diagonal bridging.
  - b. Two rows of bolted diagonal erection bridging must be installed near the third point of the steel joist.
  - c. Hoisting cables cannot be released until this bolted diagonal erection bridging is installed and anchored
  - d. No more than two employees are allowed on these spans until all other bridging is installed and anchored.
- Where the span of the steel joist is over 100 feet through 144 feet:
  - a. All rows of bridging must be bolted diagonal bridging.’
  - b. Hoisting cables cannot be released until all bridging is installed and anchored
  - c. No more than two employees are allowed on these spans until all bridging is installed and anchored.
- For steel members spanning over 144 feet, the erection methods for beams and columns must be followed.
- Where the steel joist(s) specified in this section is a bottom chord-bearing joist, a row of bolted diagonal bridging must be provided near the support(s). This bridging must be installed and anchored before the hoisting cable(s) is released.
- When bolted diagonal erection bridging is required, the following applies:
  - a. The bridging must be indicated on the erection drawing.
  - b. The erection drawing must be the exclusive indicator of the proper placement of this bridging.
  - c. Shop-installed bridging clips, or functional equivalents, must be used where the bridging bolts to the steel joists.
  - d. When two pieces of bridging are attached to the steel joist by a common bolt, the nut that secures the first piece of bridging cannot be removed from the bolt for the attachment of the second
  - e. Bridging attachments cannot protrude above the top chord of the steel joist.

During the construction period when loads are being landed and placed, the following applies:

- The employer must ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist(s).
- Other than decking, when the necessary criteria have been met, no construction loads are allowed on the steel joists until all bridging is installed, anchored and all joist-bearing ends attached.
- The weight of a bundle of joist bridging cannot exceed a total of 1,000 pounds. A bundle of joist bridging must be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle must be positioned within one foot of the secured end.
- The edge of the construction load must be placed within one foot of the bearing surface of the joist end.

### **Systems Engineered Metal Buildings**

All of these requirements apply to the erection of systems-engineered metal buildings except for column anchorage and open web steel joists.

Each structural column must be anchored by a minimum of four anchor rods (anchor bolts). Rigid frames must have 50 percent of their bolts or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released.

Construction loads cannot be placed on any structural steel framework unless such framework is safely

bolted, welded or otherwise adequately secured.

In girt and eave strut-to-frame connections, when girts or eave struts share common connection holes, at least one bolt with its wrench-tight nut must remain connected to the first member unless a manufacturer-supplied, field-attached seat or similar connection device is present to secure the first member so that the girt or eave strut is always secured against displacement.

Both ends of all steel joists or cold-formed joists must be fully bolted and/or welded to the support structure before:

- Releasing the hoisting cables
- Allowing an employee on the joists
- Allowing any construction loads on the joists

Purlins and girts cannot be used as an anchorage point for a fall arrest system unless written approval is obtained from a qualified person.

Purlins may only be used as a walking/working surface when installing safety systems, after all permanent bridging has been installed and fall protection is provided.

Construction loads may be placed only within a zone that is within 8 feet of the centerline of the primary support member.

### **Falling Object Protection**

All materials, equipment, and tools, which are not in use while aloft, must be secured against accidental displacement.

The controlling contractor must bar other construction processes below steel erection unless sufficient overhead protection for the employees below is provided.

### **Fall Protection**

Each employee engaged in steel erection activities who is on a walking/working surface with an unprotected side or edge more than six (6) feet above a lower level must be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, fall restraint systems, or positioning device systems and one of the above mentioned (see Boldt's Fall Prevention Policy and Procedure).

On multi-story structures, perimeter safety cables must be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.

Each connector must:

- Be protected from fall hazards at 6 feet and/or above a lower level.
- Have completed connector training
- Be provided, at heights where there is a potential fall of six (6) feet or more, with a personal fall arrest system, positioning device system with a fall arrest system or fall restraint system and wear the equipment necessary to be able to be tied off; or be provided with other means of protection from fall hazards (eliminating potential fall).

A Controlled Decking Zone (CDZ) may be established in that area of the structure over six and up to 30 feet above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following shall apply:

- Each employee working at the leading edge in a CDZ must be protected from fall hazards of



more than two stories or 30 feet, whichever is less.

- Access to a CDZ must be limited to only those employees engaged in leading edge work.
- The boundaries of a CDZ must be designated and clearly marked. The CDZ cannot be more than 90 feet wide and 90 feet deep from any leading edge. The CDZ must be marked by the use of control lines or the equivalent. Each control line must have a tensile strength of 200 lbs.
- Each employee working in a CDZ must have completed CDZ training.
- Unsecured decking in a CDZ cannot exceed 3,000 square feet.
- Safety deck attachments must be performed in the CDZ from the leading edge back to the control line and have at least two attachments for each metal decking panel.
- Final deck attachments and installation of shear connectors cannot be performed in the CDZ.

The custody of fall protection provided by the steel erector must remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or their authorized representative(s):

- Has directed the steel erector to leave the fall protection in place; and
- Has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area.

### **Training**

Qualified person(s) must provide the training of personnel.

Training must be provided to all personnel exposed to fall hazards. This will consist of the following:

- The recognition and identification of fall hazards in the work area
- The use and operation of guardrail systems (including perimeter safety cable systems), personal fall arrest systems, positioning device systems, fall restraint systems, safety net systems, and other protection to be used
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls; and
- The fall protection requirements of Boldt's Fall Prevention Policy and Procedure.

In addition to the training required above, special training must be completed for personnel engaged in the following activities:

- Each person(s) connecting structural steel must be trained in the following areas:
  - a. The nature of the hazards associated with connecting
  - b. The establishment, access, proper connecting techniques and work practices
- Each person(s) working in a controlled decking zone must be trained in the following areas:
  - a. The nature of the hazards associated with work within a controlled decking zone
  - b. The establishment, access, proper installation techniques and work practices

The Steel Erection Checklist (Exhibit A) may be utilized during the initial stages of the project. These items need to be accounted for prior to the start of the steel erection process (if applicable). Any questions regarding these items should be addressed with your local Safety Representative(s).

## DEFINITIONS

ANCHORED BRIDGING: The steel joist bridging connected to a bridging terminus point.

BOLTED DIAGONAL BRIDGING: Diagonal bridging that is bolted to a steel joist or joists.

BRIDGING CLIP(S): A device that is attached to the steel joists to allow the bolting of the bridging to the steel joist.

BRIDGING TERMINUS POINT: A wall, a beam, tandem joists (with all bridging installed and a horizontal truss in the plane of the top chord) or other element at an end or intermediate point(s) of a line of bridging that provides an anchor point for the steel joist bridging.

CHOKER: A wire rope or synthetic fiber rigging assembly that is used to attach a load to a hoisting device.

COLD FORMING: The process of using press brakes, rolls, or other methods to shape steel into desired cross sections at room temperature.

COLUMN: A load-carrying vertical member that is part of the primary skeletal framing system. Columns do not include posts.

COMPETENT PERSON: A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

CONNECTOR: An employee who, working with hoisting equipment, is placing and connecting structural members and/or components.

CONSTRUCTABILITY: The ability to erect structural steel members in accordance with the policy without having to alter the over-all structural design.

CONSTRUCTION LOAD (FOR JOIST ERECTION): Any load other than the weight of the employee(s), the joists and the bridging bundle.

CONTROLLED DECKING ZONE (CDZ): An area in which certain work (for example, initial installation and placement of metal decking) may take place without the use of guardrail systems, personal fall arrest systems, fall restraint systems, or safety net systems and where access to the zone is controlled.

CONTROLLED LOAD LOWERING: Lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

CONTROLLING CONTRACTOR: A prime contractor, general contractor, construction manager or any other legal entity, which has the overall responsibility for the construction of the project - its planning, quality and completion.

CRITICAL LIFT: A lift that (1) exceeds 75 percent of the rated capacity of the crane or derrick, or (2) requires the use of more than one crane or derrick.

**DECKING HOLE:** A gap or void more than two (2) inches in its least dimension and less than twelve (12) inches in its greatest dimension in a floor, roof or other walking/working surface. Pre-engineered holes in cellular decking (for wires, cables, etc.) are not included in this definition.

**DERRICK FLOOR:** An elevated floor of a building or structure that has been designated to receive hoisted pieces of steel prior to final placement.

**DOUBLE CONNECTION:** An attachment method where the connection point is intended for two pieces of steel, which share common bolts on either side of a central piece.

**DOUBLE CONNECTION SEAT:** A structural attachment that, during the installation of a double connection, supports the first member while the second member is connected.

**ERECTION BRIDGING:** The bolted diagonal bridging that is required to be installed prior to releasing the hoisting cables from the steel joists.

**FALL RESTRAINT SYSTEM:** A fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include a lanyard, and may also include a lifeline and other devices.

**FINAL INTERIOR PERIMETER:** The perimeter of a large permanent open space within a building such as an atrium or courtyard. This does not include openings for stairways, elevator shafts, etc.

**GIRT (IN SYSTEMS-ENGINEERED METAL BUILDINGS):** A "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting wall material.

**HEADACHE BALL:** A weighted hook that is used to attach loads to the hoist load line of the crane.

**HOISTING EQUIPMENT:** Commercially manufactured lifting equipment designed to lift and position a load of known weight to a location at some known elevation and horizontal distance from the equipment's center of rotation. "Hoisting equipment" includes but is not limited to cranes, derricks, tower cranes, barge-mounted derricks or cranes, gin poles and gantry hoist systems. A "come-a-long" (a mechanical device, usually consisting of a chain or cable attached at each end, that is used to facilitate movement of materials through leverage) is not considered "hoisting equipment."

**LEADING EDGE:** The unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.

**METAL DECKING:** A commercially manufactured, structural grade, cold rolled metal panel formed into a series of parallel ribs. This includes metal floor and roof decks, standing seam metal roofs, other metal roof systems and other products such as bar gratings, checker plate, expanded metal panels, and similar products. After installation and proper fastening, these decking materials serve a combination of functions including, but not limited to: a structural element designed in combination with the structure to resist, distribute and transfer loads, stiffen the structure and provide a diaphragm action; a walking/working surface; a form for concrete slabs; a support for roofing systems; and a finished floor or roof.

**MULTIPLE LIFT RIGGING:** A rigging assembly manufactured by wire rope rigging suppliers that facilitates the attachment of up to five independent loads to the hoist rigging of a crane.

OPENING: A gap or void 12 inches or more in its least dimension in a floor, roof or other walking/working surface. For the purposes of this subpart, skylights and smoke domes that do not meet the strength requirements must be regarded as openings.

PERMANENT FLOORING: A structurally completed floor at any level or elevation (including slab on grade).

PERSONAL FALL ARREST SYSTEM: A system used to arrest an employee in a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, and a body harness used with a lanyard, deceleration device, lifeline, or suitable combination of these. The use of a body belt for fall arrest is prohibited.

POSITIONING DEVICE SYSTEM: A body belt or body harness rigged to allow an employee to be supported on an elevated, vertical surface, such as a wall or column and work with both hands free while leaning.

POST: A structural member with a longitudinal axis that is essentially vertical, that: (1) weighs 300 pounds or less and is axially loaded (a load presses down on the top end), or (2) is not axially loaded, but is laterally restrained by the above member. Posts typically support stair landings, wall framing, mezzanines and other substructures.

PROJECT STRUCTURAL ENGINEER OF RECORD: The registered, licensed professional responsible for the design of structural steel framing and whose seal appear on the structural contract documents.

PURLIN (IN SYSTEMS-ENGINEERED METAL BUILDINGS): A "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting roof material.

QUALIFIED PERSON: One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

SAFETY DECK ATTACHMENT: An initial attachment that is used to secure an initially placed sheet of decking to keep proper alignment and bearing with structural support members.

SHEAR CONNECTOR: Headed steel studs, steel bars, steel lugs, and similar devices that are attached to a structural member for the purpose of achieving composite action with concrete.

STEEL ERECTION: The construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection.

STEEL JOIST: An open web, secondary load-carrying member of 144 feet or less, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses or cold-formed joists.

STEEL JOIST GIRDER: An open web, primary load-carrying member, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses.

STEEL TRUSS: An open web member designed of structural steel components by the project structural engineer of record. For all intents and purposes, a steel truss is considered equivalent to a solid web structural member.

*STRUCTURAL STEEL*: A steel member, or a member made of a substitute material (such as, but not limited to, fiberglass, aluminum or composite members). These members include, but are not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, and all bridging, and cold-formed metal framing that is integrated with the structural steel framing of a building.

*SYSTEM-ENGINEERED METAL BUILDING*: A metal, field-assembled building system consisting of framing, roof and wall coverings. Typically, many of these components are cold-formed shapes. These individual parts are fabricated in one or more manufacturing facilities and shipped to the job site for assembly into the final structure. The engineering design of the system is normally the responsibility of the systems-engineered metal building manufacturer.

*TANK*: A container for holding gases, liquids or solids.

*UNPROTECTED SIDES OR EDGES*: Any side or edge (except at entrances to points of access) of a walking/working surface, such as a floor, roof, ramp or runway, where there is no wall, guardrail system or equivalent protection provided.

# Exhibit A – Steel Erection Checklist



## Steel Erection Checklist

Notification to begin with steel erection must be provided to the steel erector. All items must be checked and confirmed during an initial conference before beginning steel erection. Document necessary items.

- Adequate access roads into and through the site for safe delivery and movement of cranes, derricks, trucks, other necessary equipment, and the material to be erected must be provided. This includes adequate space for storage of materials and safe operation of the equipment.
  
- Foundation concrete has reached 75% of design strength or is sufficient based on requirements of the Structural Engineer of Record. Masonry wall grout/mortar has been tested and meets the same requirements as above.  
Method of confirmation: \_\_\_\_\_  
Attach a copy of concrete and/or masonry test results or where records can be obtained.
  
- All columns have four (4) anchor bolts. Modifications to anchor bolts are approved by the Structural Engineer of Record (beating with a hammer would not be considered a modification requiring documentation).  
Method of confirmation: \_\_\_\_\_  
Attach a copy or give location where records can be obtained.
  
- Hoisting operations for the steel erection must be pre-planned/predetermined to prevent employees from working under suspended loads. If this cannot be accomplished, a site-specific plan must be implemented thus providing equivalent protection.  
Method of confirmation: \_\_\_\_\_  
Attach a copy if a site-specific plan is implemented.
  
- Cranes and derricks may be used to hoist personnel on suspended work platforms provided all the necessary regulations are complied with (see Boldt's Suspended Work Platform Policy and Procedure). The use of a basket is no longer a last resort if the procedure is done properly.  
Method of confirmation: \_\_\_\_\_  
Attach a copy of the program/documentation if a basket is utilized.
  
- Boldt does allow the use of multiple-lift rigging (Christmas-treeing) with preapproval from the Safety Department. OSHA does allow this practice and stipulates the requirements within the standard. This is a factor on projects that were not self-performing the steel erection. The biggest requirement within the standard is that the crane manufacturer must allow multiple-lift rigging with their crane(s).  
Method of confirmation: \_\_\_\_\_  
Attach documentation from the crane manufacturer that allows Christmas-treeing.
  
- Safety latches on hooks cannot be deactivated during the hoisting and placing of purlins/joists unless a qualified rigger has determined that it can be done more safely or when equivalent protection is provided in a site-specific plan.  
Method of confirmation: \_\_\_\_\_  
Attach name of qualified rigger or site-specific plan.
  
- Steel joists at or near columns that span more than 60', the joists must be set in tandem with all bridging installed unless an alternative method that provides equivalent stability is designed by a qualified person and is included in a site-specific plan.  
Method of confirmation: \_\_\_\_\_  
If bridging or equiv. cannot be installed, attach name of qualified person and site-specific plan.

- Critical lifts are defined within the standard. A critical lift is a lift that exceeds 75% of the rated capacity of the crane or derrick, or requires the use of more than one crane or derrick. A critical lift form is provided within Boldt's Crane/Rigging/Signaling Operations Policy and Procedure. It is available and recommended that it be utilized for large and/or difficult lifts.

Method of confirmation: \_\_\_\_\_  
If form is utilized, attach name of qualified person and completed form.

- Bundles of decking cannot be placed on steel joists until all bridging has been installed, anchored and joist bearing ends attached unless:
  - A qualified person determines within a site-specific plan that the structure will support the load.
  - The bundle is placed on a minimum of three joists.
  - The joists supporting the bundle are attached at both ends.
  - At least one row of bridging is installed and anchored.
  - The total weight of the bundle doesn't exceed 4,000 lbs. and
  - The edge of the construction load must be placed within one foot of the bearing surface of the joist end.

- Columns are set up to accept perimeter protection. Perimeter protection installed by the steel erector must remain in place for other trades to utilize. Prior to allowing other workers in the area, the controlling contractor must inspect and accept responsibility for the fall protection.

Method of confirmation: \_\_\_\_\_  
Attach a copy or give documentation/date of acceptance.

- All workers must be provided some form of fall protection at heights greater than 15' (Boldt's Policy is 6'). The exception: Individuals performing metal decking operations. They may utilize a fall protection plan that utilizes a controlled access/decking zone at levels not greater than two (2) stories or 30'. Therefore, a plan may be utilized between 15-30' (Boldt's Policy is 6-30'). Anything over 30' for decking operations requires some other form of fall protection. If a fall protection plan can be utilized it must be site-specific. Also, steel joists and girders cannot be utilized as anchorages for fall arrest equipment unless written approval is obtained to do so by a qualified person.

Method of confirmation: \_\_\_\_\_  
Attach a copy if a site-specific plan is implemented and/or the name of the qualified person.

- Shear connectors and other similar devices that project vertically from or horizontally across the top flange of the member cannot be attached until after the metal decking, or other walking/working surface, has been installed.

- Workers cannot walk the top surface of any structural steel member installed after **January 18, 2006**, that has been coated with paint or similar material unless documentation or certification that the coating has achieved a minimum average slip resistance of 0.50 when measured with an English XL tribometer or equivalent tester. The results must be available at the site and to the steel erector.

Method of confirmation: \_\_\_\_\_  
Attach a copy of the slip-resistance certification if allowing workers to walk the steel.

- A qualified person must perform training regarding fall hazards. In addition to this training, special training is required when performing multiple-lift rigging, if allowing connectors special considerations regarding fall protection heights (Boldt does not allow either of the above), or when employees will be utilizing a controlled access/decking zone.

Method of confirmation: \_\_\_\_\_  
Attach a copy of training documentation or location where these are accessible.



## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: May 16, 2001

## Suspended Work Platforms

### Purpose

To establish a safety program for the use of suspended platforms, by means of a crane, and to communicate this program to all employees and supervisors.

### Scope

An outline of the requirements for construction, testing, and use of crane suspended personnel platforms.

### Responsibility

- The project manager and jobsite superintendent must implement and enforce this policy and review each situation in which a suspended personnel platform is to be used, prior to being issued.
- The project manager must authorize the use of the suspended personnel platform and designate an individual who will supervise all site tests, trial runs, and the proper use of the platform.
- The crane operator may make personnel lifts only after all the requirements of this procedure have been satisfied.

### Restrictions

- The use of a crane to hoist employees on a personnel platform is prohibited, with the exception of steel erection or when the erection, use, or dismantling of conventional means of reaching worksite locations (e.g., ladder, stairway, aerial lift, or scaffold) would be more hazardous or is not possible because of structural design or worksite conditions.
- No employee can ride the hook or the overhaul (headache) ball.
- Standing on the guardrail system is prohibited.
- The suspended work platform is not to be altered in any shape, manner, or form unless authorization is granted by either the Safety Department or a certified structural engineer of record.

### Operational Criteria - General Requirements

- The operator of a crane used to raise or lower a work platform must be authorized by the employer and be properly qualified to perform the operation.
- The operator of the crane cannot be authorized to raise or lower a work platform unless he/she is completely familiar with the crane, with a minimum of eight hours or more of experience and/or training with an operator experienced in the type of crane being used for the raising and lowering of the work platform.
- The authorized operator must have a thorough understanding of the requirements of these rules pertaining to the use of work platforms.
- Hoisting of the personnel platform must be performed in a slow, controlled, cautious manner with no sudden movements of the crane or platform. Lifting and lowering speeds cannot exceed 100 feet per minute. Free spooling is prohibited when using the platform to lower personnel.



- The operator of the crane must remain at the controls with the engine running when an occupied work platform is in the suspended position.
- Load lines must be capable of supporting, without failure, at least seven times the maximum intended load, except where rotation resistant rope is used, in which case the lines must be capable of supporting without failure, at least ten times the maximum intended load.
- The crane must be uniformly level within one percent (1%) of level grade and be located on firm footing. Cranes equipped with outriggers must have them all deployed following the manufacturer's specifications when hoisting employees.
- Load and boom hoist drum brakes, swing brakes, and locking devices such as paws or dogs, as equipped, must be engaged when the occupied personnel platform is in a stationary working position.
- A positive means that is controllable from the operator's station must be provided to hold the drum from rotating in the lowering direction and be capable of holding the rated load indefinitely without further attention from the operator.
- Cranes having a live boom in which lowering is controlled by a brake only is prohibited from use. The load line hoist drum shall have a system or device on the power train, other than the hoist brake, which regulates the lowering rate of speed of the hoist mechanism (controlled load lowering). Free fall is prohibited. Only a crane equipped with a boom that has a power control lowering system is allowed to raise or lower a work platform.
- The load line of the crane used to raise or lower a platform must be equipped with a swivel to prevent any rotation of the work platform. Non-spin wire is prohibited. Non-spin wire rope is not the same as rotation resistant rope.
- When a crane is being used to raise and lower persons on a work platform, there cannot be any other load attached to the work platform, and no other load can be raised or lowered at the same time by the same crane.
- If arc welding is performed by an employee on the work platform, the electrode holders must be protected from contact with metal components of the work platform.
- A work platform cannot be used during high winds, electrical storms, snow, ice, sleet, or other adverse weather conditions which could affect the safety of employees on the work platform or the operation of the crane.
- Hoisting of employees must be promptly discontinued upon indication of any dangerous weather conditions or other impending danger.
- A crane used to raise or lower a work platform cannot be used under energized power transmission and distribution lines or within ten feet, horizontally, at the closest point of travel from a power line.
- The total weight of the loaded personnel platform and related rigging cannot exceed 50% of the rated capacity for the radius and configuration of the crane.
- Neither the work platform nor the crane boom shall be lowered below the point where less than three full wraps of rope remain on its respective drums.
- A crane used to raise or lower a work platform must be set on a firm base and chocked to prevent movement.
- The crane cannot travel in any direction when personnel are on the work platform.
- A crane equipped with outriggers must have the beams and jacks fully extended to provide conditions of maximum stability and the floats must have a stable bearing when the work platform is in use.
- An employee cannot leave the suspended work platform, except for a structural steel connector or pile driver. The door to the platform must be securely closed during travel to and from work locations.
- Employees on the work platform must be provided with, and required to use, a safety harness with lanyard. The lanyard is to go around the upright post of the basket or the existing forged eyehook of the work platform. Only one person is to be secured to each upright post or

forged eyehook. Where forged eyehooks are utilized, the lanyard must have a double locking snap hook to prevent roll out.

- Employees must keep all parts of the body inside the platform during raising, lowering, and positioning. This provision does not apply to an occupant of the platform performing duties of a signal person.
- Before employees exit or enter a hoisted personnel platform that is not landed, the platform must be secured to the structure where the work is to be performed, unless securing to the structure creates an unsafe situation.
- Tag lines must be used unless their use creates an unsafe condition.

### **Instruments And Components**

- Cranes with variable angle booms must be equipped with a boom angle indicator, readily visible to the operator.
- Cranes with telescoping booms must be equipped with a device to indicate clearly to the operator at all times the booms' extended length, or an accurate determination of the load radius to be used during the lift must be made prior to hoisting personnel.
- A positive acting device must be used which prevents contact between the load block or overhaul ball and the boom tip (anti-two-blocking device), or a system used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two block damage prevention feature).
- A crane must be equipped with a power control lowering system if it is going to be used to raise or lower employee platforms.
- Load line of the crane must be equipped with a swivel to prevent any rotation of the work platform. NON-SPIN WIRE ROPE IS PROHIBITED.

### **Communications**

- Employees being hoisted must remain in continuous sight of and in direct communication with the operator or signal person. If hand signals are being employed and employees are being raised, lowered, or positioned and are not in continuous sight of the operator of the crane at all times, the employer must designate an employee who is not on the work platform to be a signal person. The signal person cannot be assigned any other duties while the work platform is in a suspended position with employees on it and must remain in a position so that both the work platform and the crane operator can be seen at all times.
- In those situations where direct visual contact with the operator is not possible and the use of a signal person would create a greater hazard for that person, direct communication alone such as a radio may be used. This radio frequency must be separate from all other frequencies used on the project.

### **Personnel Platform Loading**

- The personnel platform cannot be loaded in excess of its rated load capacity.
- The number of employees occupying the personnel platform cannot exceed the number indicated on the identification plate attached to the platform.
- Personnel platforms must be used only for employees, their tools, and the materials necessary to do their work, and cannot be used to hoist only materials or tools when not hoisting personnel.
- Materials and tools for use during a personnel lift must be placed to prevent displacement and/or secured.
- Materials and tools for use during a personnel lift must be evenly distributed within the confines of the platform while the platform is suspended.
- If arc welding is done by an employee on the platform, the electrode holders must be protected from contact with metal components of the work platform.

- The only tools permitted on the work platform must be hand and portable powered tools. The total weight of compressed gas containers cannot be more than twenty pounds. A work platform cannot be used to transport bulk material. The total load cannot exceed the rated capacity of the work platform (Michigan requirement).

### **Rigging**

- A wire rope bridle used to connect the personnel platform must have a four-point suspension system with a minimum safety factor of seven times the intended load. Each leg must be suspended at a maximum forty-five degree angle from vertical toward the center using a minimum 1/2 inch diameter wire rope with swag fittings on each end. Such wire rope must be capable of maintaining the platform in a level position regardless of load placement. Wire rope clips are prohibited.
- All eyes in wire rope slings must be fabricated with thimbles.
- Wire rope, shackles, rings, master links, and other rigging hardware must be capable of supporting at least seven (7) times the maximum intended load, except where rotation resistant rope is used, the lines shall be capable of supporting, without failure, ten (10) times the maximum intended load.
- Hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies must be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut, and retaining pin may be used. A positive-lock model "pl" latches with locking bolt/nut assembly will be used eliminating throat hook opening (Exhibit A).
- Bridles and associated rigging for attaching the personnel platform to the hoist line may only be used to hoist employees, tools, and the materials necessary to do their work, and cannot be used for any other purpose (e.g., material hoist).
- Attachment of the personnel platform must be made by directly connecting the wire rope spreader (forged eye to which the bridle legs are connected), directly to the hook on the headache ball.

### **Pre-Lift Meeting**

- Prior to hoisting any personnel and prior to making the trial lift, a meeting must be held to review the requirements of this procedure. This meeting must be repeated for each new lift site and/or each time new employees are assigned to the personnel hoisting operation. The following must attend this meeting:
  - a. crane operator
  - b. signal person(s)
  - c. employees to be lifted
  - d. person responsible for the task to be performed

The pre-lift procedure form must be completed at this time (Exhibit B)

### **Jobsite Trial Lift**

- A trial lift with the unoccupied personnel platform loaded at least to the anticipated lift weight must be made from ground level, or any other location where employees will enter the platform, to each location at which the personnel platform is to be hoisted and positioned.
- The trial lift must be performed immediately prior to placing personnel on the platform and must be repeated each time the crane is moved or when the lift route is changed. A single trial lift may be performed at one time for all locations that are to be reached from a single set up point.
- During the trial, the operator must determine that all systems, controls, and safety devices are activated and functioning properly; that no interferences exist; and that all configurations

necessary to reach those work locations will allow the operator to remain under the 50% limit of the hoist's rated capacity.

- After the trial lift and just prior to hoisting personnel, the platform must be hoisted a few inches above ground and inspected to ensure it is secure and properly balanced. A visual inspection of the crane, rigging, personnel platform, and crane base support or ground must be performed by a competent person. The employee must determine whether the testing has exposed any defects or produced any adverse effect upon any component or structure. All defects must be corrected and retested prior to hoisting personnel. Employees cannot be hoisted until the safety inspection checklist is completed (Exhibit C).
- Prior to using any crane for personnel hoisting, all necessary inspections, including the annual and daily inspection, must have been performed. All defects found must be corrected and verified on the inspection report and copies of these inspection reports available in the crane cab. A copy of the load tests including the trial lift test will be maintained in the crane cab or within the jobsite file. Upon completion of the use of the personnel platform, send all inspection reports for the personnel platform to the Safety Department in the Corporate Office.

### **Load Testing (Full-Cycle Test Lift)**

- Before a work platform is used after fabrication, it must be load-tested to:
  - Wisconsin - 125% of the rated capacity
  - Minnesota - 150% of maximum intended load
  - Michigan - 200% of maximum intended load
  - Load testing must also be done after any repair or modification is performed on the personnel platform and must also be made before hoisting employees for the first time at each new setup location.

The personnel platform must be held in a suspended position for five (5) minutes with the test load evenly distributed on the platform. NOTE: The trial lift can be done concurrently with load testing.

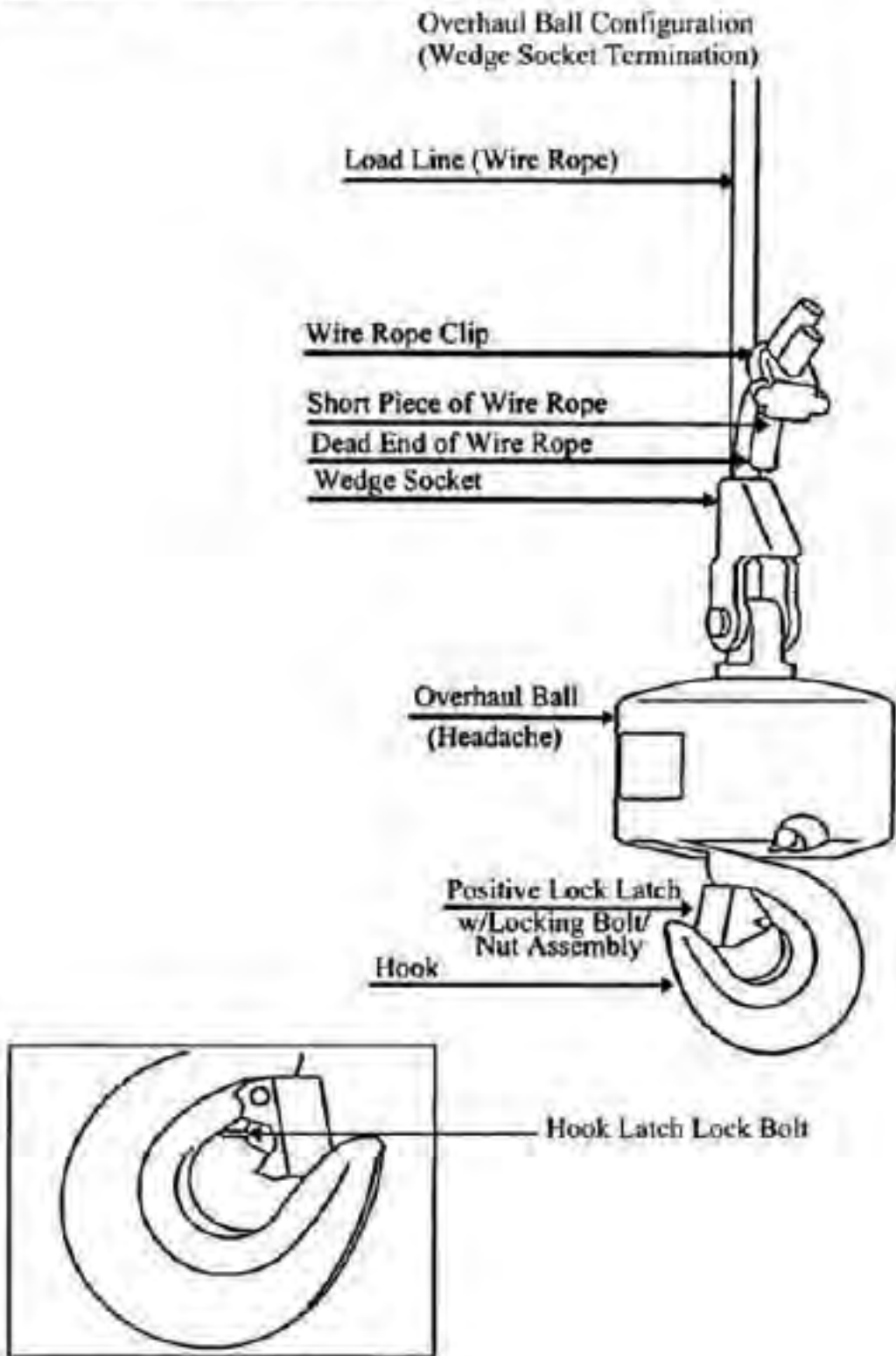
- A record of the test must be maintained by the employer (Exhibit D).

### **Personnel Platform Design And Specifications**

- The personnel platform and suspended system must be designed by a qualified engineer or a qualified person competent in structural design.
- The suspension system must be designed to minimize tipping of the platform due to movement of employees occupying the platform.
- The personnel platform itself, except the guardrail system and body harness anchorages, must be capable of supporting, without failure, its own weight and at least five (5) times the maximum intended load.
- Have a continuous guardrail system constructed as follows:
  - a. A top rail located not less than thirty-six (36) inches or more than forty-two (42) inches above the platform floor and constructed to withstand 5,400 lbs. minimum pressure in any direction.
  - b. A mid rail installed at mid-height between the top rail and platform floor and constructed to withstand a 200 lb. side thrust.
  - c. Have a toe board which is not less than four (4) inches in nominal height and which is installed not more than 1/4 inch above the floor around the periphery of the work platform or have a steel grating installed between the floors and, at a minimum, the mid rail. If the platform has a gate, the toe board or steel grating must be installed directly on the gate.
- Have wood planking, steel plate, or grating bolted or welded to the bottom of the platform which is to be maintained free of slip or trip hazards.

- Have an independent 4-point suspension system with a minimum safety factor of five (5) times the intended load. Each leg must be suspended at a maximum 45 degree angle from vertical toward the center using a minimum 1/2 inch diameter wire rope with swag fittings on each end. Such wire rope must be capable of maintaining the platform in a level position regardless of load placement. Wire rope clips are prohibited.
- Have the 4-point suspension system attached to the platform using proper size screw shackles.
- Have the suspension system connected to the load line by a screw pin shackle or a safety hook.
- Access gates, if installed, must be designed to swing inward only.
- Access gates must be equipped with a restraining device to prevent accidental opening.
- Headroom a minimum of six (6) feet must be provided which allows employees to stand upright in the platform.
- In addition to hard hats, employees must be protected by overhead protection of the personnel platform when they are exposed to falling objects.
- All rough edges exposed to contact by employees must be surfaced or smoothed in order to prevent injury to employees from puncture or lacerations.
- Have a permanently affixed sign specifying the maximum number of passengers, work platform identification number, the maximum rated load, and the weight of the personnel platform (Exhibit E).
- The work platform must be highly visible and easily identifiable.

**Exhibit A- Overhaul Ball Configuration**



# Exhibit B - Pre-lift Procedure

## PRE-LIFT PROCEDURE

Crane No. & Make \_\_\_\_\_ Suspended Basket No. \_\_\_\_\_

### I. MACHINE'S CAPACITY TO LIFT

\*Outriggers must be set/tracks extended whenever possible.

1. TOTAL length of machine boom and lowest working degree angle = \_\_\_\_\_ ft.  
\_\_\_\_\_ lowest degree of angle.
2. Maximum capacity of crane for 360 degree operation with desired boom length at lowest degree of angle:
  - a. Without outriggers set/tracks extended \_\_\_\_\_, OR
  - b. With outriggers set/tracks extended \_\_\_\_\_
3. SAFE WORK LOAD = Maximum capacity of machine at lowest degree of angle X .50 = \_\_\_\_\_ lbs.

### II. SAFE WORKING LOAD OF SUSPENDED BASKET

\*Maximum number of workers is two.

\*Rated capacity of suspended basket = 1,000 lbs.

1. Weight of personnel = 250 lbs.  
250 X \_\_\_\_\_ person(s) = \_\_\_\_\_ lbs.
2. Weight of tools and equipment = \_\_\_\_\_ lbs.
3. Total weight in suspended basket = \_\_\_\_\_ lbs. (add 1 & 2)
4. If total weight is less than or equal to 1,000 lbs. (rated capacity of suspended basket), proceed to next section.

### III. MACHINE'S CAPACITY TO LIFT vs. TOTAL WEIGHT OF LOAD

1. Weight of suspended basket \_\_\_\_\_ lbs.
2. Total weight in suspended basket \_\_\_\_\_ lbs.  
(section II, item 3)
3. Weight of load block \_\_\_\_\_ lbs.  
(Include weight of any additional ball & hook)
4. TOTAL WEIGHT TO BE LIFTED = \_\_\_\_\_ (add 1 thru 3)
5. Safe Work Load = \_\_\_\_\_ lbs.  
(section I, item 3)

If safe work load is greater than the total weight to be lifted, then proceed with pre-lift cycling and testing.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date & Time

## Exhibit C- Safety Inspection Checklist

### **SAFETY INSPECTION CHECKLIST**

For Suspended Personnel Platform  
(Completion after trial lift)

- \_\_\_\_\_ Base support or ground underneath crane is stable.
- \_\_\_\_\_ Crane uniformly level within one percent (1%) of grade.
- \_\_\_\_\_ Hoist ropes are free of kinks and frays.
- \_\_\_\_\_ Multiple part lines shall not be twisted around each other.
- \_\_\_\_\_ The primary attachment shall be centered over the platform.
- \_\_\_\_\_ The hoisting system shall be inspected if the load rope is slack to ensure all ropes are properly stated on the drums and sheaves.
- \_\_\_\_\_ Inspect the crane hook for wear or cracks.
- \_\_\_\_\_ Positive-Lock latch with locking bolt/nut assembly working properly (locked-out).
- \_\_\_\_\_ Inspect rigging on suspended personnel platform (cable, wedge sockets, thimbles, eye bolts, and O-ring).
- \_\_\_\_\_ Personnel platform identification plate attached to the platform.

Supervisor \_\_\_\_\_ Date \_\_\_\_\_



**Exhibit D- Load Testing Documentation**

**LOAD TESTING DOCUMENTATION**

Crane (Make) \_\_\_\_\_

Model \_\_\_\_\_

Personnel Platform No. \_\_\_\_\_

Personnel platforms need to be load tested as follows in the following states:

Wisconsin - 125% of rated capacity

Minnesota - 150% of maximum intended load

Michigan - 200% of maximum intended load

For states not listed above contact the safety department.

Load tested at \_\_\_\_\_ lbs.

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

## Exhibit E- Personnel Platform Identification Plate

### Personnel Platform Identification Plate

Platform No. \_\_\_\_\_

Weight of Personnel Platform \_\_\_\_\_

Rate Capacity \_\_\_\_\_

Maximum Number of People Allowed in Basket \_\_\_\_\_

All personnel occupying the suspended platform must tie-off to upright post connected to the bottom of the roof.

## Trenching and Excavation

There are many areas of concern related to the safety of both employees and the general public during trenching and excavating activities. The purpose of these policies and procedures is to identify the requirements and responsibilities of every Boldt employee. This includes the requirements mandated by the Occupational Safety and Health Administration (OSHA) as well as specific work procedures developed by the Safety Department of Boldt.

Trenching operations, whether done by mechanical equipment or by hand, have long been a source of serious injuries, fatalities, and property damage. The range of operations (blasting, dewatering, movement of heavy equipment, the handling of heavy materials, maintenance of traffic flow, etc.) and the potential of cave-in combine to complicate operations.

- Many workers are killed or severely injured in trench cave-ins each year.
- Extensive property damage is caused, or at least alleged, from blasting in trenches.
- Sidewalks, roads, and adjacent structures are damaged by settlement and undermining caused by trenching and related operations.
- Underground and overhead utilities are frequently damaged by excavation equipment, resulting in costly service interruptions and repairs.
- Pedestrians and vehicles fall into inadequately protected trenches.

### Pre-Bid Planning

Plans, specification, and test borings, if available need to be reviewed to determine:

- Right of way
- Best access routes for equipment to follow to the jobsite:
  - a. How much and what types of traffic will be entering or passing near the excavation site?
- Relative location of roads, sidewalks, and structures which may require barricades, shoring, underpinning, pre-job survey, and/or monitoring during the course of construction.
  - a. How large and how deep will the excavation be?
  - b. How near will the excavation be to existing structures and improvements?
  - c. If shoring is needed, what kinds and what sizes?
- Existence of utilities (underground and overhead), determination of operations, and protection procedures in their vicinity.
- Soil conditions, geology, and seismicity of the area.
  - What types of soil will be encountered?
  - What are the soil moisture conditions?
  - Has the soil previously been disturbed?
  - What range of weather conditions can be expected during this period?
- Requirements for and control of dewatering operations.
- Requirements for and control of blasting operations
  - a. Will the excavation operation create shock and vibration such as from blasting or pile driving?
  - b. Are other sources of shock or vibration nearby?
- Requirements for signs, barricades, flaggers, and traffic control plans. Identify and analyze material and equipment storage areas for access and security.
- How long will the excavation or portions are opened?

- What type of equipment will be used and where will it be located? Properly contact all utility companies and authorities requesting location and assistance in protecting them from damage. Identify source of personnel. Establish procedures for operator selection. Determine what personal protective equipment is needed. Walk the right of way to determine adequacy of plans and existence of additional exposures.

### **Forms/Permits Required**

The Excavation Entry Permit (Exhibit A) shall be completed prior to the start of all trenching/excavations. Underground installations must be located before excavating by contacting utility companies and if they can't respond and locate them within 24 hours, using detective equipment and acceptable means to locate utility installations.

A Daily Excavation Log (Exhibit B) must be completed by a competent person prior to entering a trench/excavation when the following conditions exist:

- Excavations 5 feet or greater (less than five 5 feet in unstable soil).
- Exposure to an atmosphere containing less than 19.5% oxygen and/or other hazardous atmospheres in excavations greater than 4 feet.

### **Trenching/Excavations Operations**

All trenches must be opened wide enough to achieve stable bank conditions. That is, slopes at least 1-1/2:1 in type C\* soil, 1:1 in type B\* soil, and 3/4:1 in type A\* soil. If it is not possible to cut back to the angle of repose, all trenches five (5) feet or more in depth must be shored or trench shields used. In trenches 4 feet or more in depth, ramps, ladders, or steps must be provided. Ladders are to be placed so that no employee will have to move more than 25 feet laterally to exit.

Ladders need to extend at least 36 inches above ground and be secured whenever possible.

Properly constructed/fabricated ramps may be used to permit individuals to cross the trench safely. Excavated and loose material shall be back a minimum of 2 feet from the edge of the cut.

All underground utilities are to be located prior to the start of any work to establish location of utility installations (electric, telephone, cable, gas, water, sewer, etc.). Call 811 emergency numbers. Underground utilities are to be protected, supported, or removed while the trench is open. Move or support all surface encumbrances (trees, boulders, fire hydrants, light poles, etc.) that may create a hazard to employees.

Employees are not permitted underneath loads handled by lifting or digging equipment.

\*Type A means cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam, and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

- The soil is fissured
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects
- The soil has been previously disturbed
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater
- The material is subjected to other factors that would require it to be classified as a less stable material.

**\*Type B means:**

- Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48kPa) but less than 1.5 (144 kPa)
- Granular cohesion less soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and, in some cases, salty clay loam and sandy clay loam.
- Previously disturbed soils except those which would otherwise be classified as Type C soil.
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subjected to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

**\*Type C means:**

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less
- Granular soils including gravel, sand, and loamy sand
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or steeper.

To determine soil type, a penetrometer is to be used. A pocket penetrometer is available via the Safety Department.

**Trench Shoring**

When shoring is used, it must extend along as the excavation progresses and follow as close as possible to the end of the equipment.

The type of shoring and bracing used is dependent upon the nature of the soil, depth, and width of trench.

- Most commonly used material is wood and heavy timber.
- In certain soils and under unusual conditions, such as the presence of ground water, interlocking steel sheeting is recommended.
- Trench shields constructed of steel plate sides and heavy steel bracing may be used in some unstable ground situations. The shield may be moved along by the excavator.
- Excavations of earth material to a level not greater than 2 feet below the bottom of a shield or support system are permitted, but only if the shield or support system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield or support system.

**General Rules**

- Excavations must have safe access and egress areas (e.g. ramps, ladders, stairs) every 25 feet along the excavation.
- Blasting is frequently involved in trenching operations and must be conducted in accordance with applicable regulations and codes.
- Excavating equipment must rest on a firm base away from the edge of the cut.
- Spotters must be used to direct truck movements in and around the area.
- Stop logs or barricades must be used where there is a potential of vehicles approaching or equipment being placed too near the edge of a trench.
- If possible, a trench would be opened in lengths in which work could be completed and then

closed at the end of the day.

- When trenches are left open overnight, they must be properly barricaded or covered with suitable materials.
- To protect against potential falling loads: employees are not permitted to work under digging equipment where it may fall on them, employees working in trenches must wear approved hard hats and safety glasses or goggles.
- Care must be taken to prevent employees from working too closely together to minimize the potential of being struck by tools or materials.
- Air monitoring is to be completed where there is employee exposure to atmospheres containing less than 19.5% oxygen and other hazardous atmospheres. Ventilation will be provided where necessary.
- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, must be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation.
- In any excavation that is over 20 feet in depth, the cave-in protection system must be designed by a licensed professional engineer. The design documents must be kept on-site during the erection or construction of the system.
- Employees exposed to public vehicular traffic, are to be provided with and wear high visible, reflective vests.
- Employees will not be permitted to work in excavations that have accumulated or are accumulating water unless they are protected by means of a shield. All trenches/excavations are to be inspected by a competent person before work begins.
- Daily inspection must be made by a competent person to make certain that shoring, bracing, and sheeting are in good condition to prevent cave-ins and protective system failures.
- In the event a situation is found that could result in a cave-in, protective system failure, hazardous atmosphere or any condition that is unsafe, all employees are to be removed from the trench/excavation immediately and not permitted to return until all precautions/corrections are completed.
- All equipment used in shoring (timbers, aluminum hydraulic shoring) and shields must be properly maintained and in good condition.
- Employees are to be protected from the hazards of falling, rolling, or sliding materials or equipment.
- Employees will not be permitted in the shield while it is being installed, relocated, or removed.
- The shield is designed to resist calculated trench forces and cannot be exposed to any excessive forces.
- The competent person will be identified, and duties will be assigned either to the project superintendent and/or foreman in charge of the project. The duties are as follows:
  - a. Ensure the trenching/excavation operation is being conducted in a safe manner.
  - b. Contact the utility companies, property owners and/or utility locators to find location of underground installations.
  - c. Conduct daily inspections to ensure integrity of trench/excavation.
  - d. Inspect on a daily basis all shoring, supports, and protective systems.
  - e. Identify existing and predictable hazards and to take prompt corrective measures to eliminate them.
- Properly maintained walkways are to be provided where employees or equipment are required to cross over. When planking is utilized as a walkway, it must be at least 18" wide (two planks minimum). Standard guardrails are to be provided where walkways are 6 feet or more above lower levels. Adequate barriers (guardrails, road barricades, etc.) are to be located at all remotely located excavations. Wells, pits, shafts, etc., must be properly barricaded or covered.

## DEFINITIONS

ACCEPTABLE PRACTICE: A practice that meets the minimum requirements of Subpart P of 29 CFR 1926.

ACCEPTED ENGINEERING REQUIREMENTS (OR PRACTICES): Those requirements or practices which are compatible with standards of practice required by a registered professional engineer or other duly licensed or recognized authority.

ANGLE OF REPOSE: The greatest angle above the horizontal plane at which a material will lie without sliding. (Angle of repose is not a unique soil property but is affected by a wide variety of environmental effects and other factors).

BANK: A mass of soil rising above a digging level.

BELLED EXCAVATION: A part of a shaft or footing excavation, usually near the bottom and bell shaped.

BENCHING: An alternate means of sloping in which the required slope is approximated as a series of "steps" cut into the excavation wall.

BOILING: Upward water flow into the bottom of an excavation (Fig. 1).

BOX SHORING: Horizontal sheeting and vertical wales permit excavation deepening and shoring to proceed concurrently (Fig. 2).

BRACES OR STRUTS (TRENCH): The horizontal members of the shoring system whose ends bear against the uprights or stringers (Fig. 3).

BRACES (EXCAVATIONS): Members of a shoring system which have one end bearing against uprights or stringers and the other end blocked from movement by heels, or buried in the floor of the excavation.

BREAST TIMBERS: See "Braces (excavations)."

BULGE: Expansion or movement of the sides into an excavation (Fig. 4).

CLEATS: Pieces of wood fixed to upright or vertical members to support horizontal members at correct levels (Fig. 3).

CLOSE SHEETING: see "Tight Sheeting."

COFFERDAM: A watertight enclosure, from which water or wet material is removed to expose the impermeable bottom for excavation or other work (Fig. 5).

COMPETENT PERSON: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

CROSS BRACES: see "Braces (trench)."

DEEP FROST ACTION: Bulging of soil and excessive loading of support systems caused by the freezing of moisture in the soil and the formation of ice lenses.

DIAGONAL SHORES: see "Braces (excavation)."

EXCAVATION: Any cavity or depression in the earth's surface created by mechanical means, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reason of the excavation. If installed forms or similar structures reduce the depth-to-width relationship (width-to-depth ratio), an excavation may become a trench. FACES: see "Sides."

FILL: A soil condition created by mechanical means that may be constructed of any type of soil or combination of soils.

FOOTBLOCKS: see "Heels."

FOUNDATION SHORING: Shoring employed in wide excavations that uses rake struts rather than cross bracing (Fig. 6).

HARD COMPACT SOIL: All earth materials not classified as running or unstable.

HEAVE: Lifting or upward bulging of the bottom of an excavation due to the weight of adjoining soil (Fig. 7).

HEELS OR FOOTBLOCKS: Stakes driven into the floor of excavations to anchor shoring braces.

HYDRAULIC SHORING: Upright brace pairs preassembled with hydraulic jacks that can be used alone or incorporated into more complex shoring systems. Installation and removal can be accomplished without entering the trench (Fig. 8).

ICE LENSES: Accumulations of ice in soil, formed by capillary migration of water through the soil to the frost line and subsequent freezing.

KICKOUTS: Accidental release or failure of a shore or brace.

MUD SILLS: Wales which are installed at the level of the bottom of the excavation walls.

PIER HOLES: Machine drilled excavations made for a column type concrete footing with or without a belled bottom.

PILE OR PILING: Upright shoring member driven below the bottom of an excavation to restrain its lower end.

PRE-FABRICATED SHORING (TRENCH): Pre-assembled shoring segments installed and removed intact from trenches, but not directly moved along in the trench as work progresses (Fig. 9).

QUALIFIED PERSON: One who, by possession of a recognized degree, certificate, or professional standing, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

RAKER STRUTS: see "Braces (excavations)."



SCABS: Pieces of wood that solidly connect the crosspieces to the horizontal wales of the shoring system (Fig. 3).

SHEETING: Members of the shoring system in direct contact with the soil in the supported wall (Fig. 3).

SHEET PILE: A pile, or sheeting, that may form one of a continuous interlocking line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

SHORING SYSTEMS: Structural systems supporting the walls of excavations.

SIDES, WALLS OR FACES: The vertical or inclined earth surfaces formed as a result of excavation work.

SILT: Fine grained soil of particles between 0.005 and 0.075 mm, cohesion less and non-plastic like sand and gravel but with a very small angle of repose. Silts have strong capillary action, and water greatly affects their engineering behavior.

SKELETON SHORING: Irregularly spaced sheeting concentrated in areas of suspected cave-ins (Fig. 10).

SLIDE PLANES: Evidence of collapse of excavation walls by shear, often along a weak plane in layered soil.

SLOPE (noun): The acute angle formed by the side of an excavation and the horizontal plane; also, the inclined side of an excavation.

SLOPE (verb): To incline the walls of an excavation to reduce the likelihood of cave-ins.

SPACED SHEETING: Sheeting that does not form a continuous solid wall in contact with the earth but has a space between each sheeting member.

SPALLING: Flaking and falling of soil or rock from an unsupported wall. SPOIL: Material taken from an excavation.

SPOIL BANK: see "Bank."

STABLE SLOPE: A slope which will remain stable for the duration of the excavation.

STRINGERS (WALES): The horizontal members of a shoring system whose sides bear against the uprights or earth (Fig. 3).

STRUTS: The primary support members of a shoring system, including cross braces, raker braces, screw jacks, hydraulic jacks, and back ties.

STRUTS (TRENCH): see "Braces (trench)."

SUBSIDENCE: Settling of the ground surface near an excavation. SUPPORT(ING)

SYSTEMS: see "Shoring Systems."

*SURCHARGE*: Added load near the edge of an excavation such as equipment, excavated material, or other stored materials.

*TELESCOPIC SHORING*: Used for deep trenches. Successive depths of excavation are cut narrower than the preceding cut and shored with overlap of the level above (Fig. 11).

*TENSION CRACKS*: Cracks initiated in the soil surface outside of and parallel to the edge of an excavation (Fig. 12).

*TIE-BACK ANCHORS*: Anchors used to support the shoring system in place of braces (Fig. 13).

*TIGHT SHEETING*: Sheeting that is butted close together to form a continuous solid wall to resist the lateral pressures of earth, water, or other material (Fig. 14).

*TOE*: The distance that sheeting is driven below the bottom of an excavation.

*TOE OF SLOPE*: The point at which the side of an excavation intersects the lowest level of the excavation.

*TRENCH*: A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

*TRENCH BOX*: see "Trench Shield." *TRENCH BRACES*: see "Braces."

*TRENCH JACK*: Screw or hydraulic type jack used as cross bracing in a trench shoring system.

*TRENCH SHIELD*: A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

*UNDERPINNING*: The adding of new permanent support to existing foundations to provide added capacity or added depth.

*UNSTABLE SOIL*: Earth material, other than running, that because of its nature or the influence of related conditions cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

*UPRIGHT BRACES, SIMPLE (TRENCH)*: Braced pairs of uprights to counteract small localized weaknesses in trench walls (Fig. 15).

*UPRIGHTS*: The vertical members of a shoring system. *WALES (WALERS)*: see "Stringers."

*WEDGES*: Pieces of wood used to stabilize vertical members against uneven or sloping walls so that shoring remain plumb and walls remain stable.

# Exhibit A – Excavation Permit



## Excavation Permit

Date: \_\_\_\_\_

Project No. \_\_\_\_\_ Name of Project: \_\_\_\_\_

Location of Excavation: \_\_\_\_\_ Excavation Permit No. \_\_\_\_\_

Purpose of Excavation: \_\_\_\_\_

Excavator: \_\_\_\_\_

### EXCAVATION PREPARATION

I. Check blueprints for location of:	Marked Location				Supv. Initials
	Yes	No	Yes	No	
A. Water Lines	_____	_____	_____	_____	_____
B. Electricity	_____	_____	_____	_____	_____
C. Gas	_____	_____	_____	_____	_____
D. Sewers	_____	_____	_____	_____	_____
E. Other	_____	_____	_____	_____	_____
F. Called digger hotline (3 workday notice needed)	_____	_____	_____	_____	_____
G. Safety meeting for personnel involved	_____	_____	_____	_____	_____

NOTE: The above items must be marked off.

Comments: (name of company and personnel contacted) \_\_\_\_\_

II. Safety:	Yes	No	Supv. Initials
A. Shoring to be used	_____	_____	_____
B. Sloping to be used	_____	_____	_____
C. Barricades (flag, stake, paint)	_____	_____	_____
D. Confined space permit needed	_____	_____	_____
E. Means of egress (ramp, steps, ladder)	_____	_____	_____
F. Trained equipment operator	_____	_____	_____
G. Trained employee(s)	_____	_____	_____

Comments: (type of shoring/sloping to be used) \_\_\_\_\_

All necessary conditions and/or preparations have been satisfied, and I certify that the safety guidelines for excavating have been followed.

Signed: \_\_\_\_\_  
(Supervisor in Charge)

Signed: \_\_\_\_\_  
(Supervisor Issuing Permit)

Form No. S-19 (2-94)

# Exhibit B – Daily Excavation Log



## Daily Excavation Log

Date: \_\_\_\_\_

Project No. \_\_\_\_\_ Name of Project: \_\_\_\_\_

Location of Excavation: \_\_\_\_\_ Excavation Permit No. \_\_\_\_\_

Competent Person: \_\_\_\_\_

Soil Classification: \_\_\_\_\_ Excavation Depth : \_\_\_\_\_ Excavation Width : \_\_\_\_\_

NOTE : Prior to start of daily work activities, all excavations 5 feet or greater (less than 5 feet in unstable soil) are to be inspected by a competent person.

### I. General Inspection of Jobsite: *(indicate for each item: Yes, No, N/A)*

- A. Barricades located around perimeters of excavations, wells, pits, shafts, etc.? \_\_\_\_\_
- B. Warning system established and utilized when mobile equipment is operating near edge of excavation? \_\_\_\_\_
- C. Walkways and bridges over excavations 4' or more in depth equipped with standard guardrail? \_\_\_\_\_
- D. Stairway, ladder, or ramp located in excavations 4' or more in depth so as to require no more than 25 feet of lateral travel for employees for access and egress? \_\_\_\_\_
- E. Are the spoil piles a minimum of 2 feet back from the edge of the excavation? \_\_\_\_\_
- F. Are employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation? \_\_\_\_\_
- G. Are ground fault circuit interrupters (GFCI's) being used on all electrical equipment? \_\_\_\_\_
- H. Adequate precaution taken to protect employees from exposure to an atmosphere containing less than 19.5% oxygen and/or other hazardous atmospheres in excavation greater than 4'? \_\_\_\_\_
- I. Crack-like opening or spalling observed? \_\_\_\_\_
- J. Did each employee receive training in excavating? \_\_\_\_\_

*(list names of employees below-please print)*

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

### II. Soil Classification (pocket penetrometer test): *(check one only)*

- \_\_\_\_\_ Type A – Cohesive soils which have an unconfined compression strength of 1.5 ton per square foot (tsf) or greater. Example: Rock, clay, and sandy loam soils. Previously disturbed soil cannot be classified as Type A soil. Slope ¾:1 (53°).
- \_\_\_\_\_ Type B – Cohesive soils which have an unconfined compression strength of 0.5 tsf but less than 1.5 tsf. Examples: Angular gravel (similar to crushed rock), silt, silt loam, and sandy loam. Slope 1:1 (45°).
- \_\_\_\_\_ Type C – Cohesive soils which have an unconfined compression strength of 0.5 tsf or less. Example: Granular soils including gravel, sand, loamy sand, and soil from which water is freely seeping and/or standing. Slope 1-1/2:1 (34°).

Form No. S-20 (Rev. 12/04)

Exhibit C- Figure 1 and Figure 2

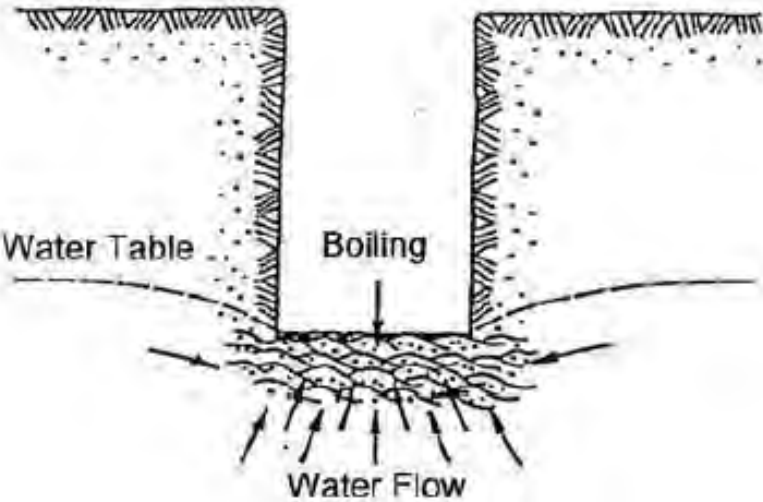


Figure 1 - Upward Water Flow Creating Quick Conditions in Trench Bottom

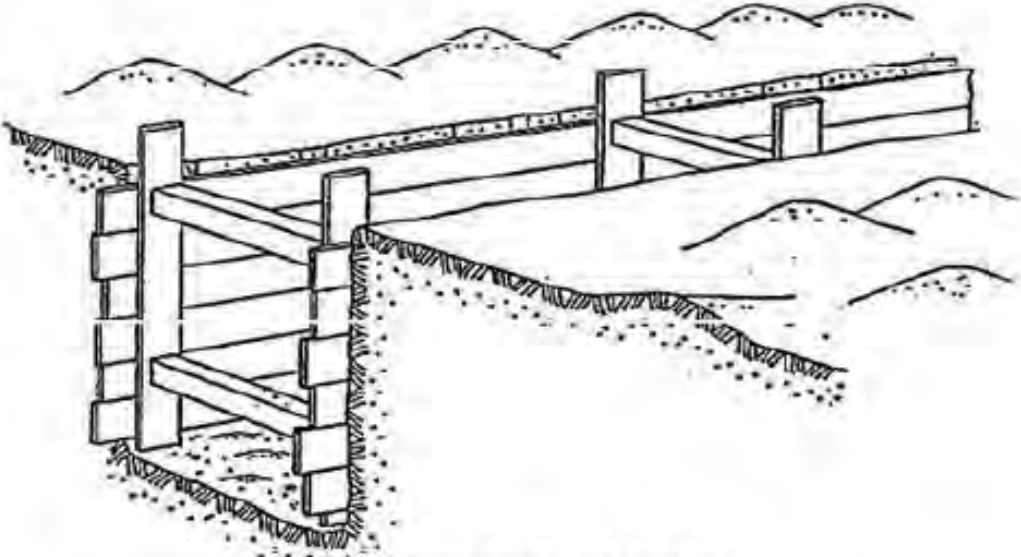


Figure 2 - Box Shoring

Exhibit D – Figure 3 and Figure 4

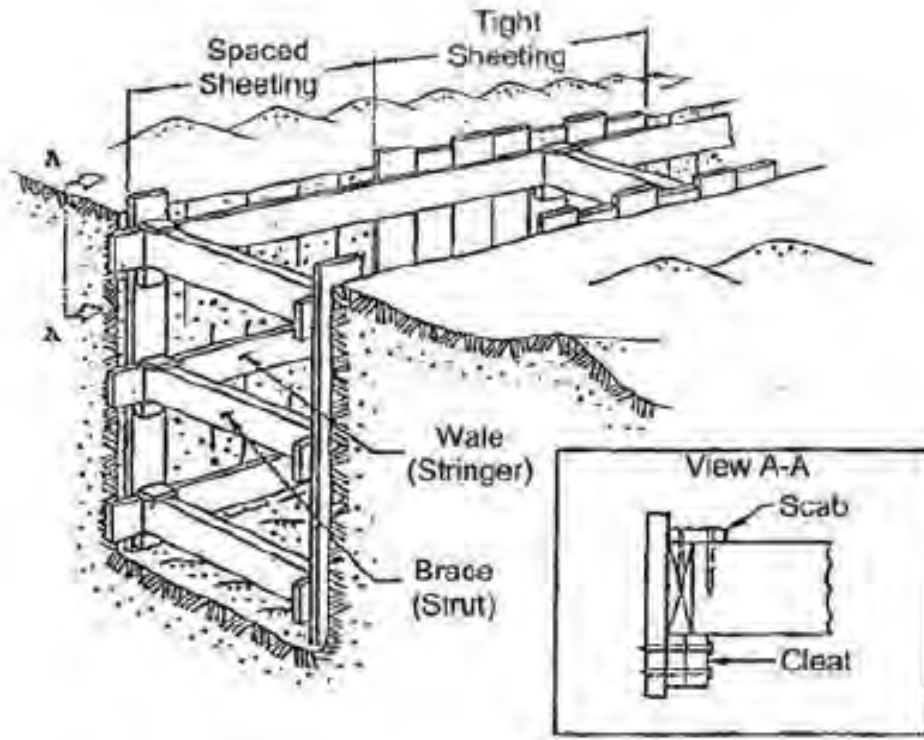


Figure 3 - Components of a Trench Shoring System

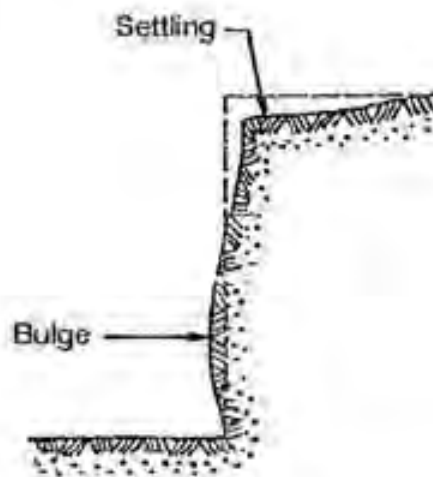
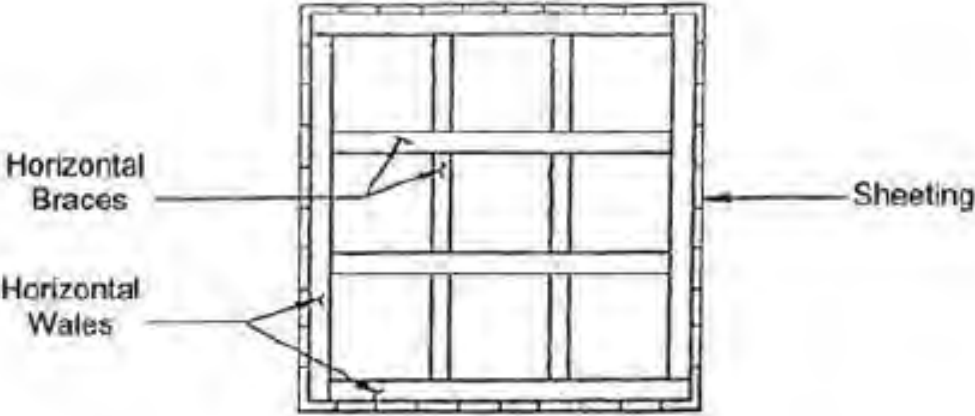
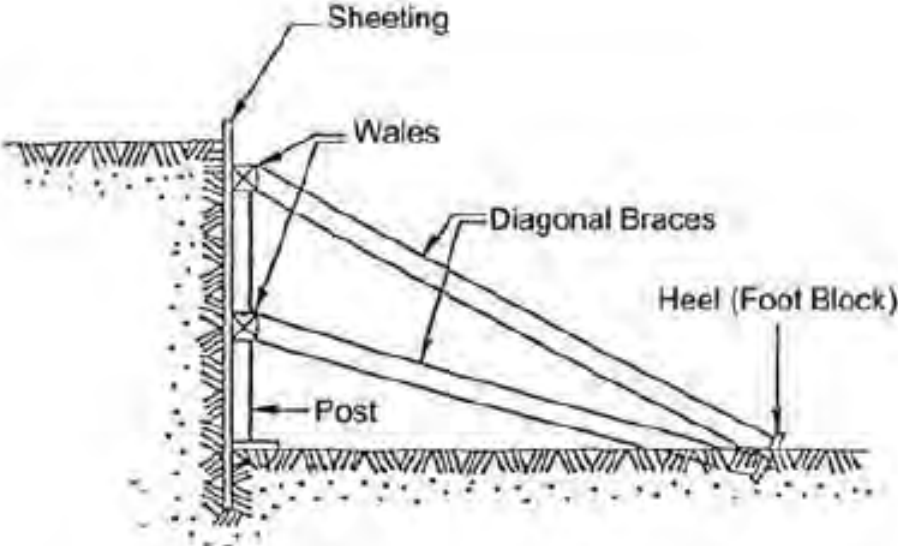


Figure 4 - Profile of Excavation Showing Settling (Subsidence) and Bulging

Exhibit E – Figure 5



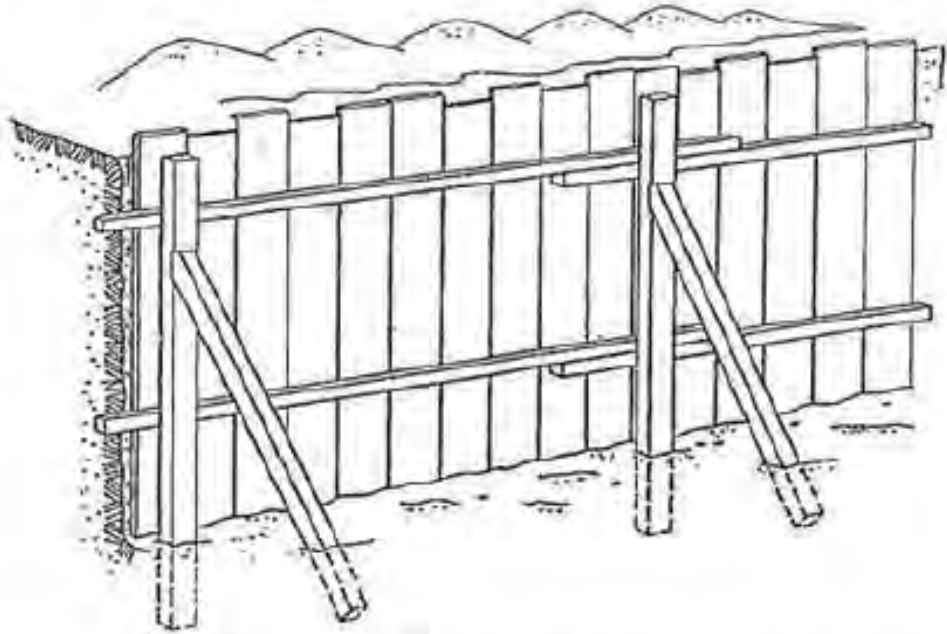
Top View of Small Cofferdam



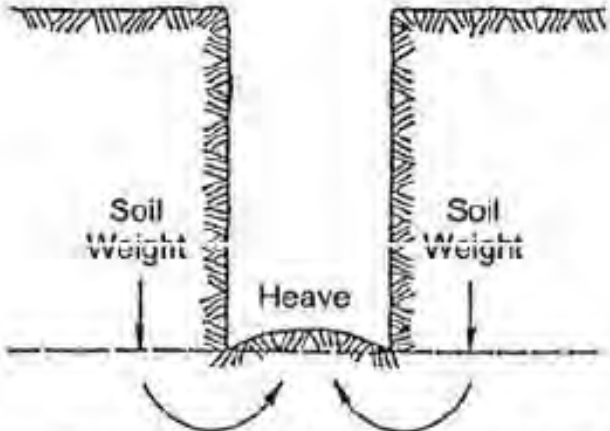
Side View of Long or Large Cofferdam

Figure 5 - Land Cofferdams

**Exhibit F – Figure 6 and Figure 7**



**Figure 6 - Foundation Shoring with Raker Struts**



**Figure 7 - Heave Due to Weight of Adjoining Soil**



Exhibit G – Figure 8 and Figure 9

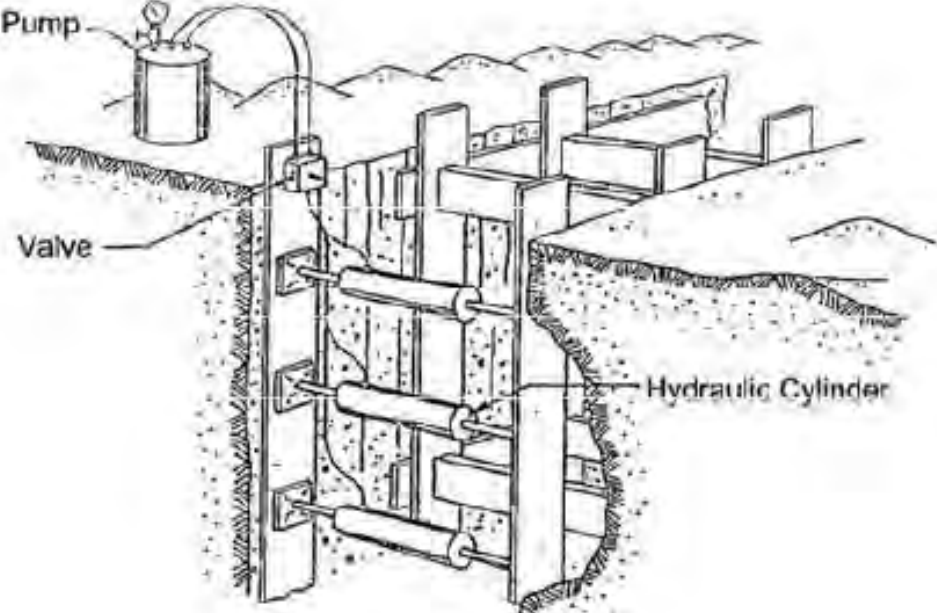


Figure 8 - Hydraulic Shore

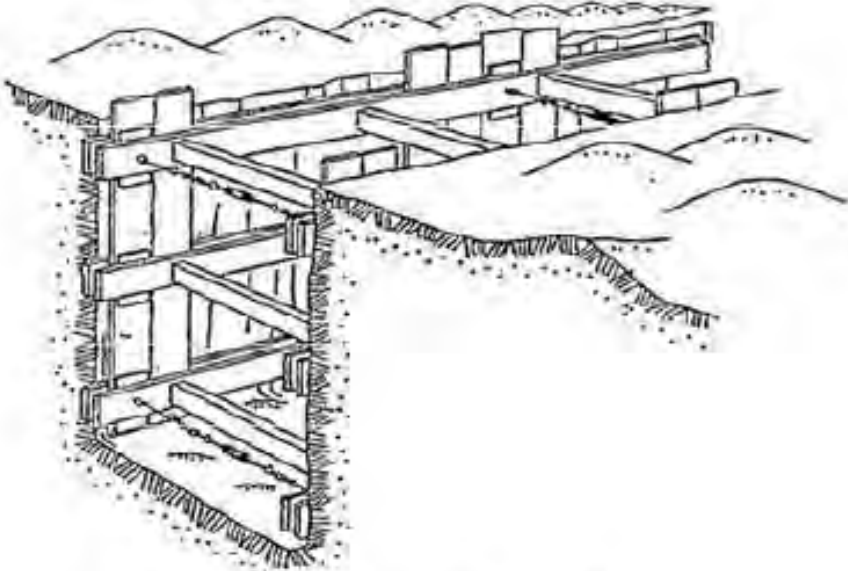
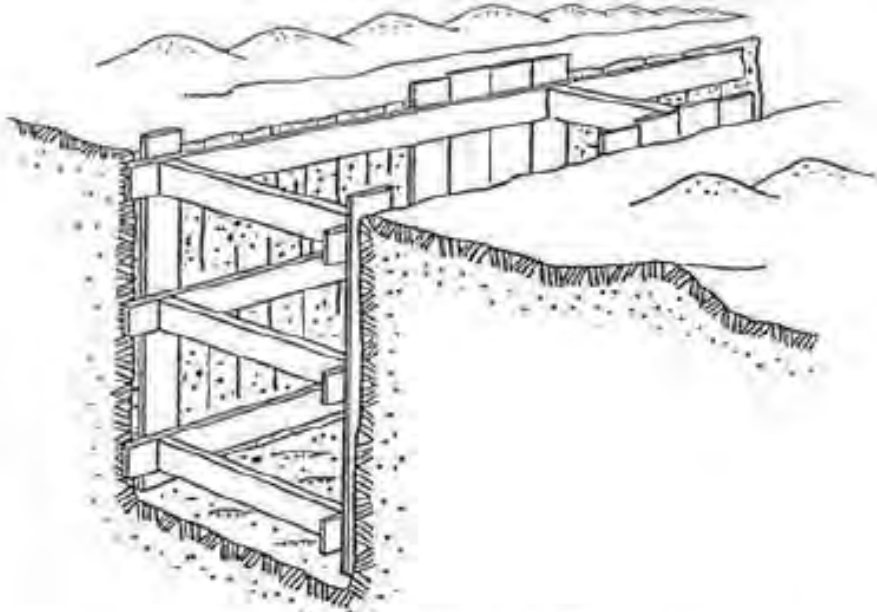
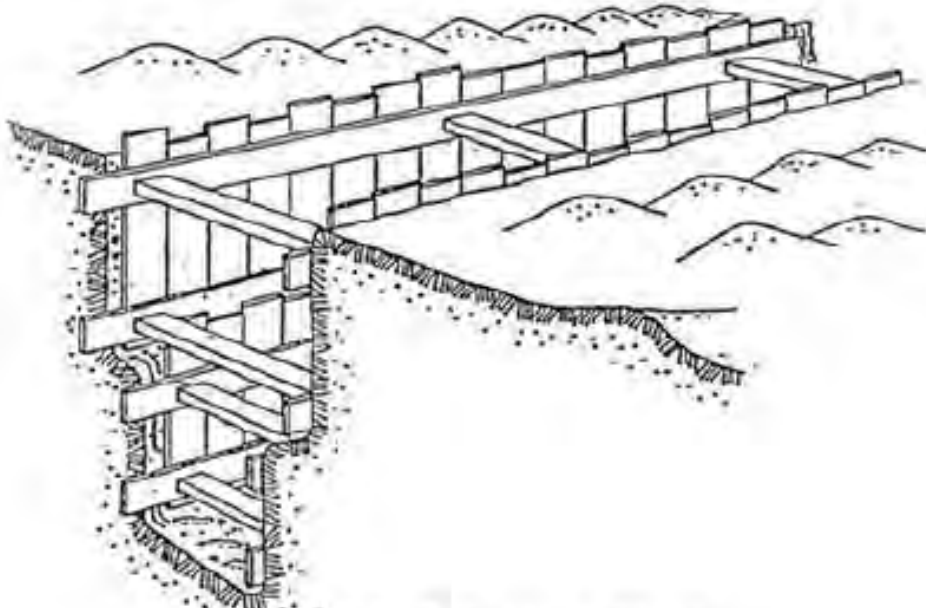


Figure 9 - Pre-Fabricated Shoring

**Exhibit H – Figure 10 and Figure 11**



**Figure 10 - Skeleton Shoring**



**Figure 11 - Telescopic Shoring**

Exhibit I – Figure 12 and Figure 13

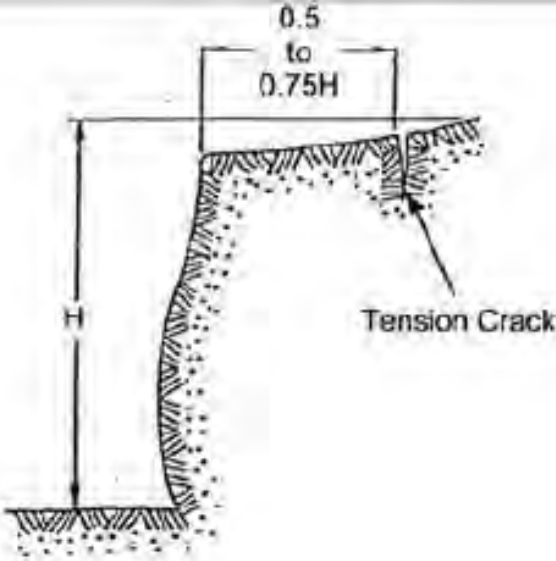


Figure 12 - Formation of Tension Crack

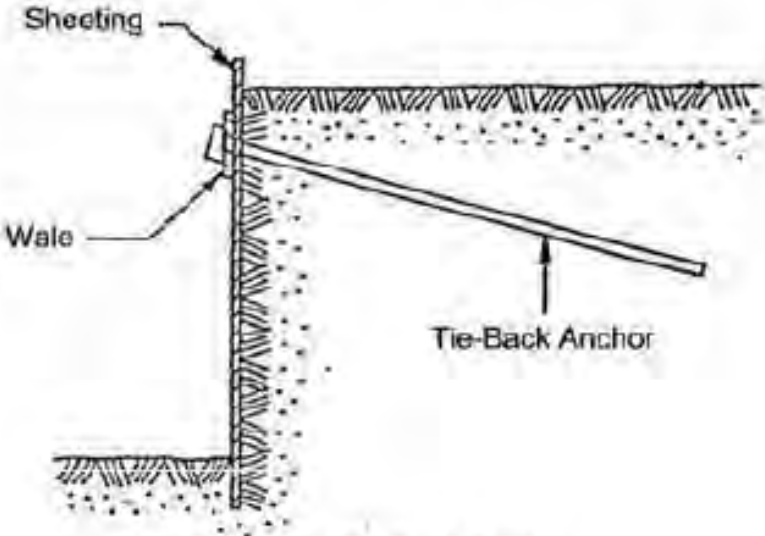
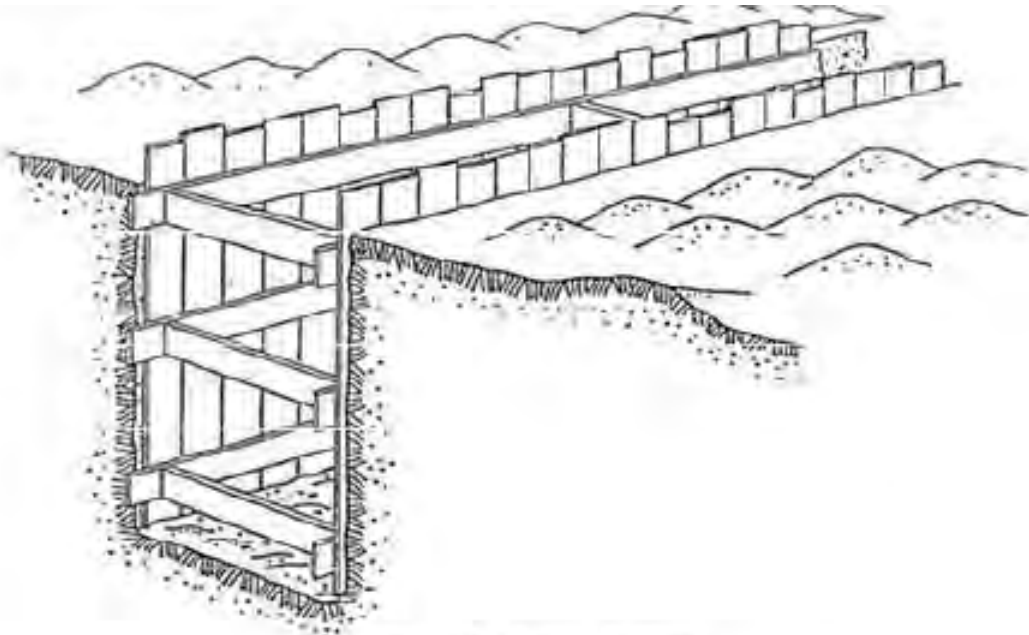
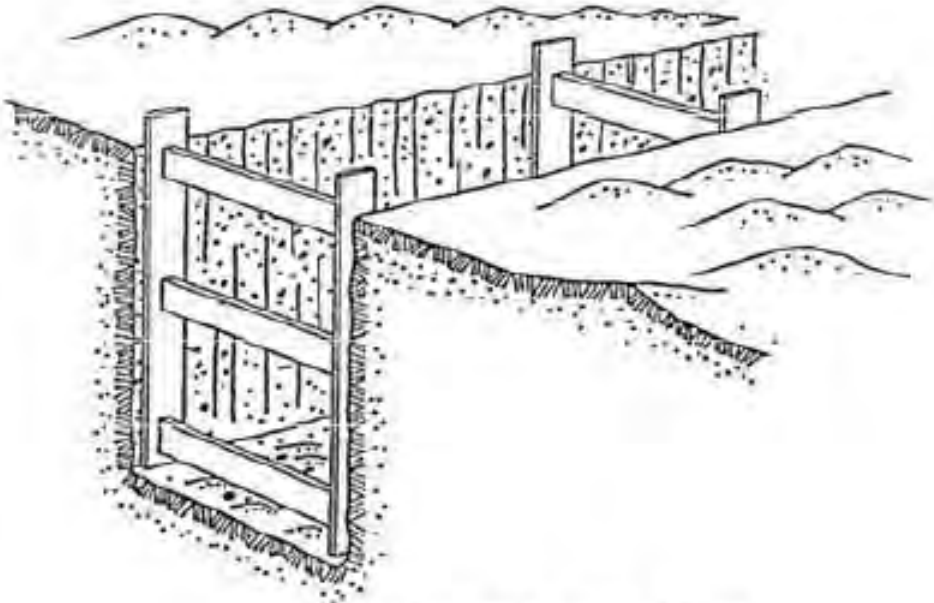


Figure 13 - Tie-Back Anchor

**Exhibit J – Figure 14 and Figure 15**



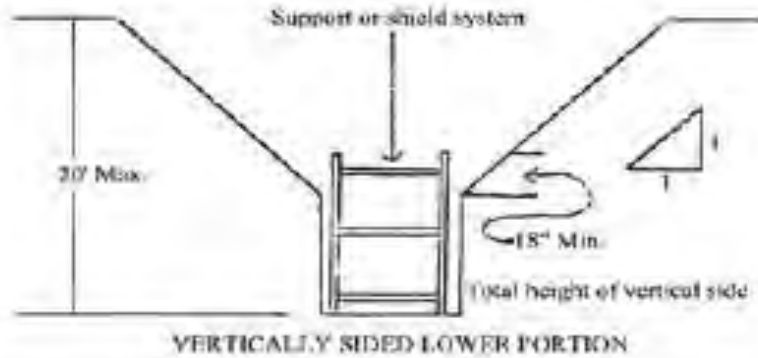
**Figure 14 - Tight Sheeting**



**Figure 15 - Simple Upright Braces**

## Exhibit K – Slope Configurations

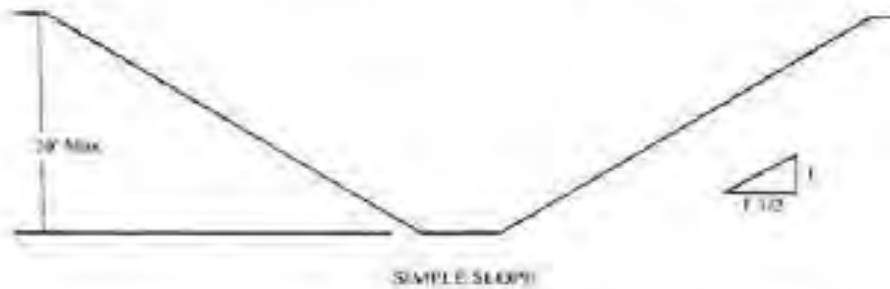
- All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.



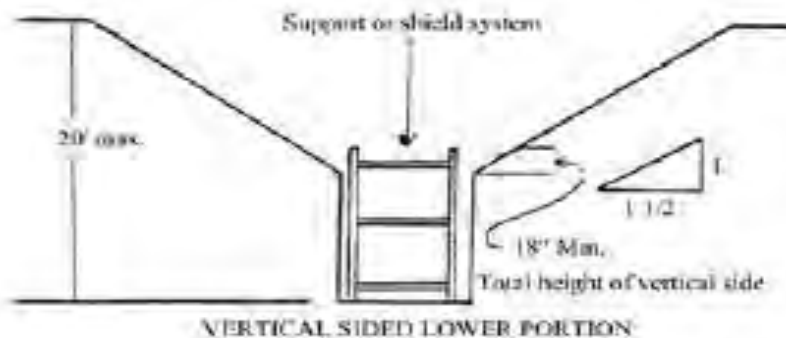
- All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

### B—1.3 Excavations Made in Type C Soil

- All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.



- All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1 1/2:1.



- All other sloped excavations shall be in accordance with the other options in §1926.652(b).

## Exhibit L – Slope Configurations

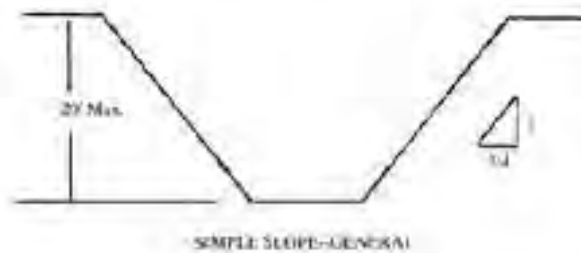
SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) <sup>1</sup> FOR EXCAVATIONS LESS THAN 20 FEET DEEP <sup>2</sup>
STABLE ROCK	VERTICAL (90°)
TYPE A <sup>3</sup>	¾:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 ½:1 (34°)

- Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
- A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).
- Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

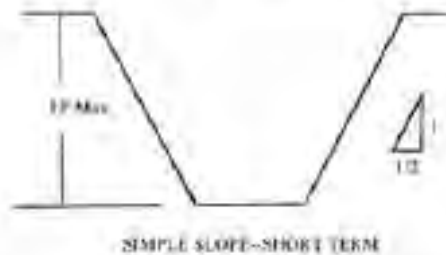
(All slopes stated below are in the horizontal to vertical ratio)

### B—1.1 Excavations made in Type A soil.

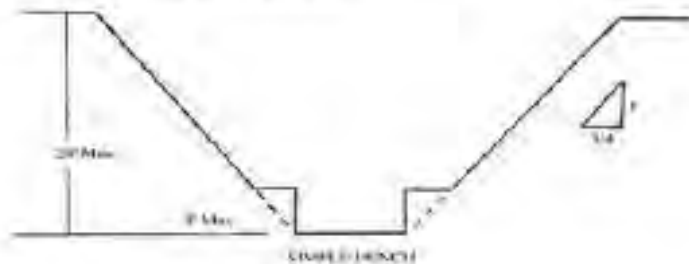
- All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of ¾:1.



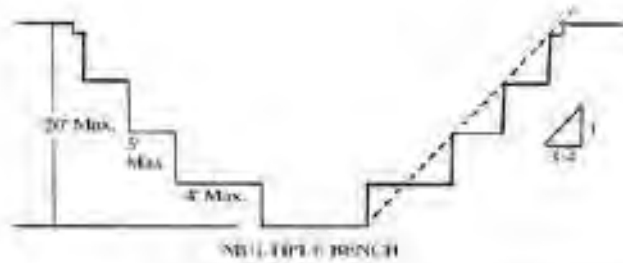
Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of ½:1.



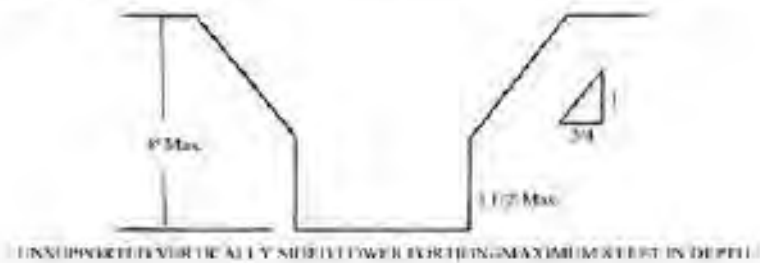
- All benched excavations 20 feet or less in depth shall have a maximum allowable slope of ¾ to 1 and maximum bench dimensions as follows:



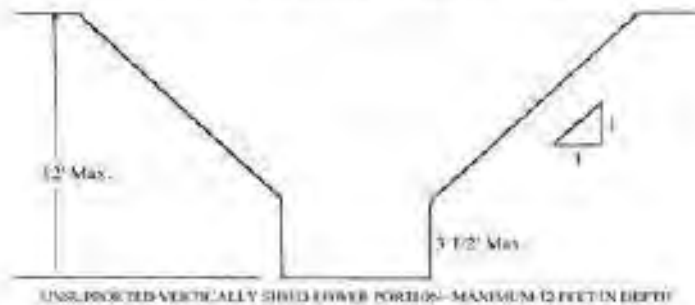
## Exhibit M – Slope Configurations



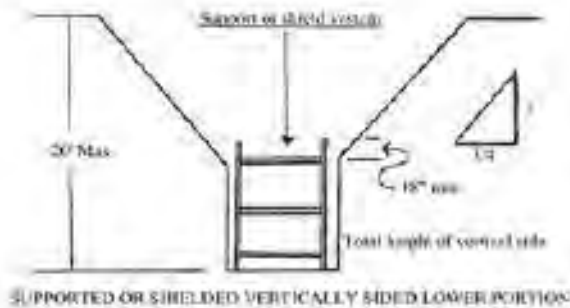
3. All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3 ½ feet.



- All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3 ½ feet.



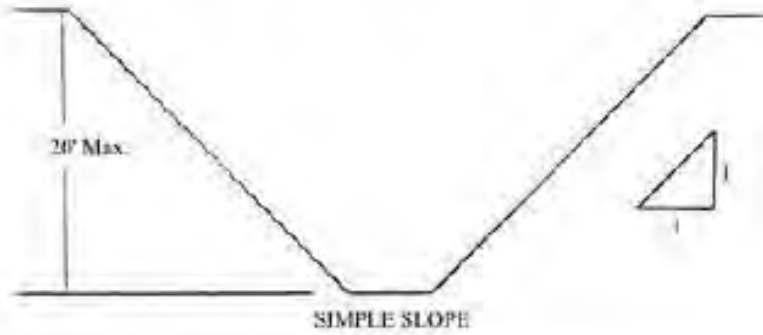
- All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 1/2:1. The support or shield system must extend at least 18 inches above the top of the vertical side.



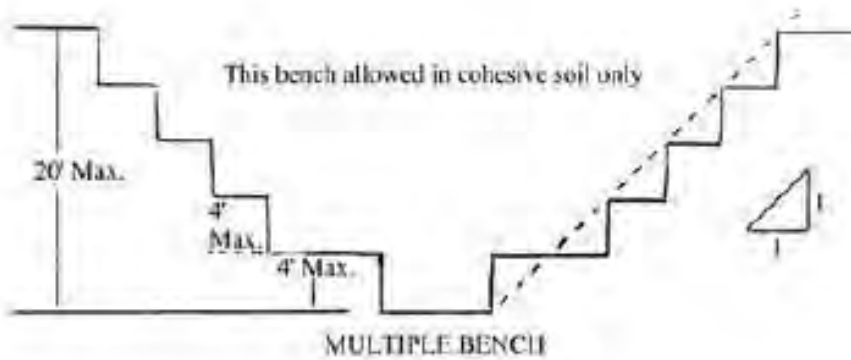
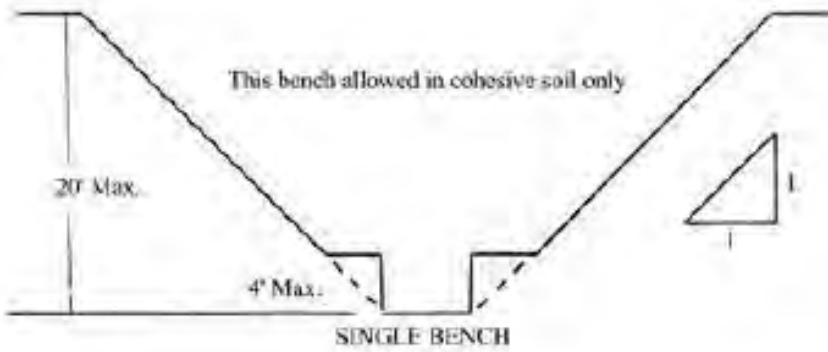
# Exhibit N – Slope Configurations

## B-1.2 Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

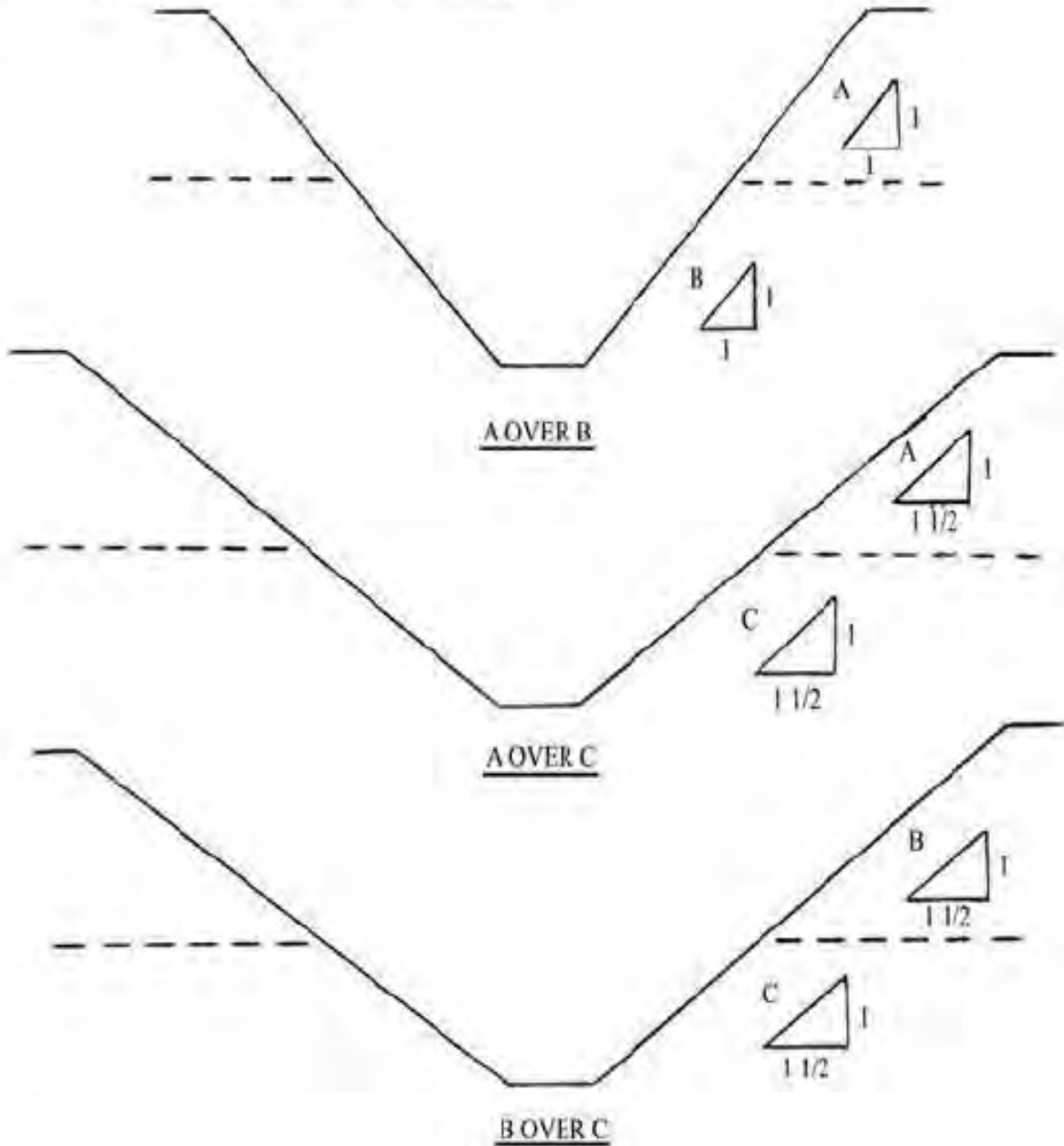


2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:





**Exhibit O- Slope Configurations**



2. All other sloped excavations shall be in accordance with the other options permitted in §1926.652(b).

Exhibit P - Table C-1.1

**Table C-1.1 Timber Trench Shoring - Minimum Timber Requirements\***  
 Soil Type A  $P_a = 25 \times H + 72$  psf (2 ft Surcharge)

Depth of Trench (Feet)	Size (Actual) and Spacing of Members**													
	Horiz. Spacing (Feet)	Cross Braces						Vert. Spacing (Feet)	Wales		Uprights			
		Width of Trench (Feet)							Size (In.)	Vert. Spacing (Feet)	Maximum Allowable Horizontal Spacing (Feet)			
		Up to 4	Up to 6	Up to 9	Up to 12	Up to 15	Up to 18				Close	4	5	6
5 to 10	Up to 6	4x4	4x4	4x6	6x6	6x6	4	Not Req'd	--				2x6	
	Up to 8	4x4	4x4	4x6	6x6	6x6	4	Not Req'd	--					2x8
	Up to 10	4x6	4x6	4x6	6x6	6x6	4	8x8	4			2x6		
	Up to 12	4x6	4x6	6x6	6x6	6x6	4	8x8	4				2x6	
10 to 15	Up to 6	4x4	4x4	4x6	6x6	6x6	4	Not Req'd	--					3x8
	Up to 8	4x6	4x6	6x6	6x6	6x6	4	8x8	4		2x6			
	Up to 10	6x6	6x5	6x6	6x8	6x8	4	8x10	4			2x6		
	Up to 12	6x6	6x6	6x6	6x8	6x8	4	10x10	4					3x8
15 to 20	Up to 6	6x6	6x6	6x6	6x8	6x8	4	6x8	4	3x6				
	Up to 8	6x6	6x6	6x6	6x8	6x8	4	8x8	4	3x6				
	Up to 10	8x8	8x8	8x8	8x8	8x10	4	8x10	4	3x6				
	Up to 12	8x8	8x8	8x8	8x8	8x10	4	10x10	4	3x6				
Over 20	See Note 1													

\*Mixed oak or equivalent with a bending strength not less than 850 psi.

\*\*Manufactured members of equivalent strength may be substituted for wood.

Exhibit Q – Table C-1.2

**Table C-1.2 Timber Trench Shoring – Minimum Timber Requirements\***  
 Soil Type B  $P_a = 45 X H + 72$  psf (2 ft Surcharge)

Depth of Trench (Feet)	Size (Actual) and Spacing of Members**											
	Horiz. Spacing (Feet)	Cross Braces					Vert. Spacing (Feet)	Wales		Uprights		
		Width of Trench (Feet)						Size (In.)	Vert. Spacing (Feet)	Maximum Allowable Horizontal Spacing (Feet)		
		Up to 4	Up to 6	Up to 9	Up to 12	Up to 15				Close	2	3
5 to 10	Up to 6	4x6	4x6	6x6	6x6	6x6	5	6x8	5			2x6
	Up to 8	6x6	6x6	6x6	6x8	6x8	5	8x10	5			2x6
	Up to 10	6x6	6x6	6x6	6x8	6x8	5	10x10	5			2x6
	See Note 1											
10 to 15	Up to 6	6x6	6x6	6x6	6x8	6x8	5	8x8	5			2x6
	Up to 8	6x8	6x8	6x8	8x8	8x8	5	10x10	5			2x6
	Up to 10	8x8	8x8	8x8	8x8	8x10	5	10x12	5			2x6
	See Note 1											
15 to 20	Up to 6	6x8	6x8	6x8	8x8	8x8	5	8x10	5	3x6		
	Up to 8	8x8	8x8	8x8	8x8	8x10	5	10x12	5	3x6		
	Up to 10	8x10	8x10	8x10	8x10	10x10	5	12x12	5	3x6		
	See Note 1											
Over 20	See Note 1											

\*Mixed oak or equivalent with a bending strength not less than 850 psi.

\*\*Manufactured members of equivalent strength may be substituted for wood.

**Exhibit R – Table C-1.3**

**Table C-1.3 Timber Trench Shoring – Minimum Timber Requirements\***

Soil Type C  $P_a = 80 X H + 72$  psf (2 ft Surcharge)

Depth of Trench (Feet)	Size (Actual) and Spacing of Members**										
	Horiz. Spacing (Feet)	Cross Braces					Vert. Spacing (Feet)	Wales		Uprights	
		Width of Trench (Feet)						Size (In.)	Vert. Spacing (Feet)	Maximum Allowable Horizontal Spacing (Feet) (see note 2)	
		Up to 4	Up to 6	Up to 9	Up to 12	Up to 15				Close	
5 to 10	Up to 6	6x8	6x8	6x8	8x8	8x8	5	8x10	5	2x6	
	Up to 8	8x8	8x8	8x8	8x8	8x10	5	10x12	5	2x6	
	Up to 10	8x10	8x10	8x10	8x10	10x10	5	12x12	5	2x6	
	See Note 1										
10 to 15	Up to 6	8x8	8x8	8x8	8x8	8x10	5	10x12	5	2x6	
	Up to 8	8x10	8x10	8x10	8x10	10x10	5	12x12	5	2x6	
	See Note 1										
	See Note 1										
15 to 20	Up to 6	8x10	8x10	8x10	8x10	10x10	5	12x12	5	3x6	
	See Note 1										
	See Note 1										
	See Note 1										
Over 20	See Note 1										

\*Mixed oak or equivalent with a bending strength not less than 850 psi.

\*\*Manufactured members of equivalent strength may be substituted for wood.

Exhibit S – Table C-2.1

**Table C-2.1 Timber Trench Shoring – Minimum Timber Requirements\***  
 Soil Type A  $P_a = 25 \times H + 72$  psf (2 ft Surcharge)

Depth of Trench (Feet)	Size (Actual) and Spacing of Members**													
	Cross Braces						Wales		Uprights					
	Horiz. Spacing (Feet)	Width of Trench (Feet)					Vert. Spacing (Feet)	Size (In.)	Vert. Spacing (Feet)	Maximum Allowable Horizontal Spacing (Feet)				
		Up to 4	Up to 6	Up to 9	Up to 12	Up to 15				Close	4	5	6	8
5 to 10	Up to 6	4x4	4x4	4x4	4x4	4x6	4	Not Req'd	Not Req'd				4x6	
	Up to 8	4x4	4x4	4x4	4x6	4x6	4	Not Req'd	Not Req'd					4x8
	Up to 10	4x6	4x6	4x6	6x6	6x6	4	8x8	4			4x6		
	Up to 12	4x6	4x6	4x6	6x6	6x6	4	8x8	4				4x6	
10 to 15	Up to 6	4x4	4x4	4x4	6x6	6x6	4	Not Req'd	Not Req'd				4x10	
	Up to 8	4x6	4x6	4x6	6x6	6x6	4	6x8	4		4x6			
	Up to 10	6x6	6x6	6x6	6x6	6x6	4	8x8	4			4x8		
	Up to 12	6x6	6x6	6x6	6x6	6x6	4	8x10	4		4x6		4x10	
15 to 20	Up to 6	6x6	6x6	6x6	6x6	6x6	4	6x8	4	3x6				
	Up to 8	6x6	6x6	6x6	6x6	6x6	4	8x8	4	3x6	4x12			
	Up to 10	6x6	6x6	6x6	6x6	6x8	4	8x10	4	3x6				
	Up to 12	6x6	6x6	6x6	6x8	6x8	4	8x12	4	3x6	4x12			
Over 20	See Note 1													

\*Douglas fir or equivalent with a bending strength not less than 1500 psi.

\*\*Manufactured members of equivalent strength may be substituted for wood.

Exhibit T – Table C-2.2

**Table C-2.2 Timber Trench Shoring – Minimum Timber Requirements\***  
 Soil Type B P<sub>a</sub> = 45 X H + 72 psf (2 ft Surcharge)

Depth of Trench (Feet)	Size (S4S) and Spacing of Members**													
	Horiz. Spacing (Feet)	Cross Braces					Vert. Spacing (Feet)	Wales		Uprights				
		Width of Trench (Feet)						Size (In.)	Vert. Spacing (Feet)	Maximum Allowable Horizontal Spacing (Feet)				
		Up to 4	Up to 6	Up to 9	Up to 12	Up to 15				Close	2	3	4	5
5 to 10	Up to 6	4x6	4x6	4x6	6x6	6x6	5	6x8	5			3x12 4x8		4x12
	Up to 8	4x6	4x6	6x6	6x6	6x6	5	8x8	5		3x8		4x8	
	Up to 10	4x6	4x6	6x6	6x6	6x8	5	8x10	5			4x8		
	See Note 1													
10 to 15	Up to 6	6x6	6x6	6x6	6x8	6x8	5	8x8	5	3x6	4x10			
	Up to 8	6x8	6x8	6x8	8x8	8x8	5	10x10	5	3x6	4x10			
	Up to 10	6x8	6x8	8x8	8x8	8x8	5	10x12	5	3x6	4x10			
	See Note 1													
15 to 20	Up to 6	6x8	6x8	6x8	6x8	8x8	5	8x10	5	4x6				
	Up to 8	6x8	6x8	6x8	8x8	8x8	5	10x12	5	4x6				
	Up to 10	8x8	8x8	8x8	8x8	8x8	5	12x12	5	4x6				
	See Note 1													
Over 20	See Note 1													

\*Douglas fir or equivalent with a bending strength not less than 1500 psi.

\*\*Manufactured members of equivalent strength may be substituted for wood.

**Exhibit U – Table C-2.3**

**Table C-2.3 Timber Trench Shoring – Minimum Timber Requirements\***  
 Soil Type C  $P_a = 80 \times H + 72$  psf (2 ft Surcharge)

Depth of Trench (Feet)	Size (S4S) and Spacing of Members**										
	Horiz. Spacing (Feet)	Cross Braces					Vert. Spacing (Feet)	Wales		Uprights	
		Width of Trench (Feet)						Size (In.)	Vert. Spacing (Feet)	Maximum Allowable Horizontal Spacing (Feet)	
		Up to 4	Up to 6	Up to 9	Up to 12	Up to 15				Close	
5 to 10	Up to 6	6x6	6x6	6x6	6x6	8x8	5	8x8	5	3x6	
	Up to 8	6x6	6x6	6x6	8x8	8x8	5	10x10	5	3x6	
	Up to 10	6x6	6x6	8x8	8x8	8x8	5	10x12	5	3x6	
	See Note 1										
10 to 15	Up to 6	6x8	6x8	6x8	8x8	8x8	5	10x10	5	4x6	
	Up to 8	8x8	8x8	8x8	8x8	8x8	5	12x12	5	4x6	
	See Note 1										
	See Note 1										
15 to 20	Up to 6	8x8	8x8	8x8	8x10	8x10	5	10x12	5	4x6	
	See Note 1										
	See Note 1										
	See Note 1										
Over 20	See Note 1										

\*Douglas fir or equivalent with a bending strength not less than 1500 psi.

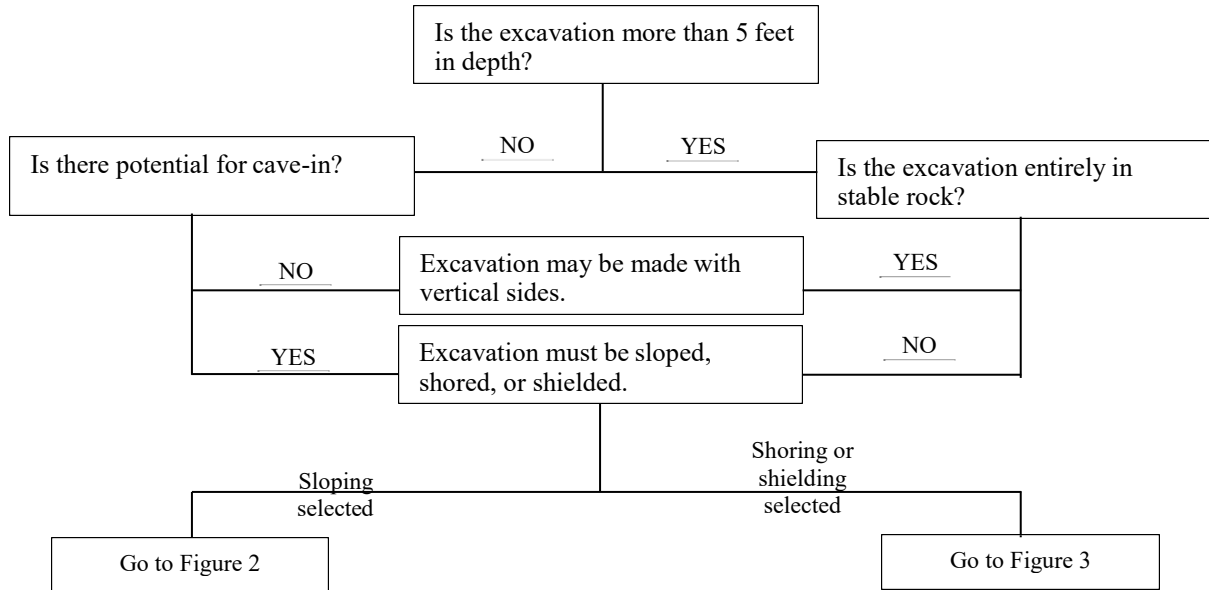
\*\*Manufactured members of equivalent strength may be substituted for wood.



# Exhibit V – Appendix F to Subpart S

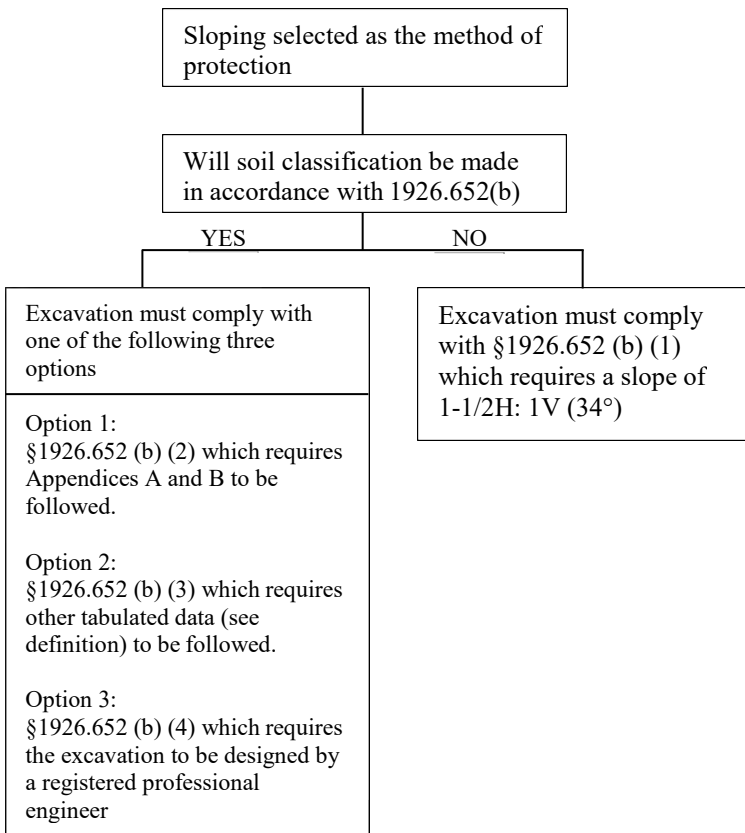
## APPENDIX F TO SUBPART S – SELECTION OF PROTECTIVE SYSTEMS

The following figures are a graphic summary of the requirements contained in subpart P for excavations 20 feet or less in depth. Protective systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer with 1926.652 (b) and (c)

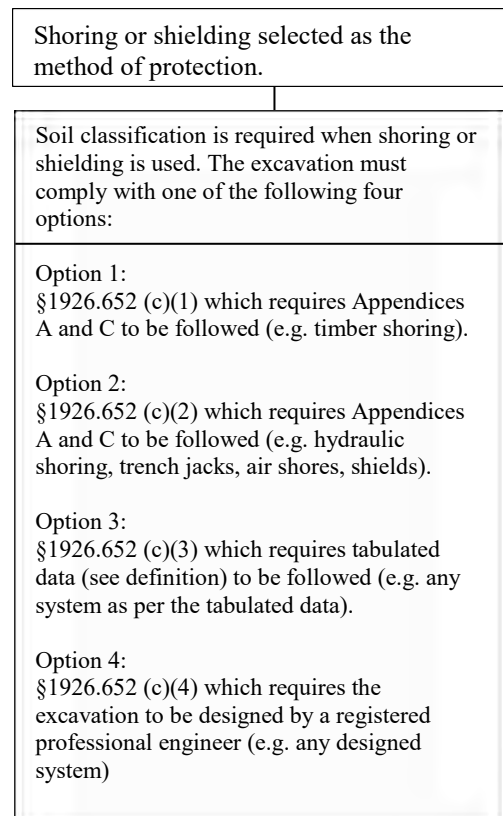


**FIGURE 1- PRELIMINARY DECISIONS**

**FIGURE 2 – SLOPING OPTIONS**



**FIGURE 3 – SHORING AND SHIELDING OPTIONS**







## Safety Program

D. Policy and  
Procedures

Reviewed: January 4, 2019

Effective: September 1, 2007

## Workplace Violence

The Boldt Company believes in the prevention of violence and promotes a violence-free workplace in which all people respect one another and work together to achieve common goals. Any act of violence committed by or against any member of our workplace or member of the public, is unacceptable conduct that will not be tolerated. This policy applies to all activities that occur while on company premises or while engaging in company business, activities, or social events.

Acts of violence can take the form of physical contact. Acts of violence may occur as a single event or may involve a continuing series of incidents. Abuse in any form erodes the mutual trust and confidence that are essential to The Boldt Company's operational effectiveness. Acts of violence destroy individual dignity, lower morale, engender fear, and break down work unit cohesiveness.

### Purpose

The purpose of this policy is to ensure that:

- Individuals are aware of and understand that acts of workplace violence are considered a serious offense for which necessary action will be imposed.
- Those subjected to acts of workplace violence are encouraged to access any assistance they may require in order to pursue a complaint.
- Individuals are advised of available recourse if they are subjected to, or become aware of, situations involving workplace violence.

### Company Commitment

The Boldt Company is committed to:

- Investigating reported incidents of workplace violence in an objective and timely manner
- Taking necessary action to respond to those incidents
- Provide support for complainants

### Prohibited Conduct

No employee or any other individual affiliated with this organization shall subject any other person to workplace violence or allow or create conditions that support workplace violence.

A member of the company that subjects another company member, client, or business associate of the company to workplace violence may be subject to disciplinary action commensurate to the incident, up to and including dismissal.

Examples of workplace violence include, but are not limited to:

- Threatening behavior such as shaking fists, destroying property or throwing objects
- Verbal or written threats that express intent to inflict harm
- Physical attacks
- Any other act that would arouse fear in a reasonable person in the circumstances

## **Management Responsibilities**

For the purpose of this policy, supervisory personnel are responsible to:

- Act respectfully towards other individuals while at work and participating in any work-related activity.
- Develop workplace arrangements that minimize the risk of workplace violence.
- Promote a non-violent workplace.
- Ensure that this policy is explained to all employees that you supervise or manage.
- Identify training needs for employees.
- Ensure that employees understand who to contact regarding concerns about the policy or when reporting an incident.
- Ensure your own immediate physical safety if an incident of workplace violence occurs, then report criminal behavior to the appropriate law enforcement agency.
- Ensure the security and safety of all parties involved during an investigation of an incident of workplace violence.

## **Employee Responsibilities**

For the purpose of this policy, employees are responsible to:

- Act respectfully towards other individuals while at work and participating in any work-related activity.
- Ensure your own immediate physical safety in the event of workplace violence, then to report the incident to the police or a supervisor or manager as the situation warrants.
- Co-operate with any efforts to investigate and resolve matters arising under this policy.

## **Complaint Procedure**

1. Prior to filing a formal report of the incident, a person subjected to workplace violence, should let their objections to the behavior be known to the alleged offender, directly or with the assistance of a third party.
2. A Complainant may ask for support from the Corp. VP of HR/RM or Corp. EEO Officer to communicate their objections to the incident and/or to prepare and submit a formal complaint if they choose. Toll free line - 888-88BOLDT
3. The Complainant should carefully record details of the incident including the date and time of the incident, the nature of the violence, and names of people who may have witnessed the incident. This document is the Complainant's personal record and property.
4. The Complainant may choose to file a formal complaint that documents their concerns to the Corp. VP of HR/RM or Corp. EEO Officer.

## **Confidentiality**

Strict confidentiality is required to properly investigate an incident and to offer appropriate support to all parties involved. Any individual who becomes aware of an incident of violence should not disclose the details of the incident to any third party without prior consultation with the Complainant.

Gossiping about an incident seriously undermines the privacy of all parties involved and will not be tolerated. Those with questions or concerns about an incident should speak to the Corp. VP of HR/RM or Corp. EEO Officer.

## **Non-Retaliation**

All persons involved in the processing of a complaint will ensure that the Complainant is neither penalized nor subjected to any prejudicial treatment as a result of making the complaint. Disciplinary action will be taken against any person who takes any reprisal against a person who reports workplace violence.

## **Investigation**

1. Upon receipt of a formal complaint of workplace violence, The Corp. VP of HR/RM or the Corp. EEO Officer will determine whether an investigation will be pursued, and will:
  - Advise the Respondent in writing of the investigation and nature and specifics of the complaint
  - Advise the Complainant of the investigation
  - Assign the investigation to an internal or external person to investigate
2. The investigator will:
  - Advise all parties to the investigation that they may have representation.
  - Conduct the investigation in accordance with the principles of natural justice.
  - Explore all allegations by interviewing the Complainant, the Respondent, and others who may have knowledge of the incident(s) or circumstances that led to the complaint, or are responsible for the workplace.
3. The investigator may make a finding of:
  - Sufficient evidence to support a finding of violation of this policy
  - Insufficient evidence to support a finding of violation of this policy
  - No violation of this policy
4. The investigator must prepare a written report of the investigation's finding, and forward that report to the Corp. VP of HR/RM or Corp. EEO Officer within thirty (30) working days from the Respondent being advised of the complaint.
5. The Corp. VP of HR/RM or the Corp. EEO Officer should make a decision whether to dismiss or act upon the report from the investigator within thirty (30) working days of receiving the report and advise the Complainant and Respondent in writing of the outcome.

## **Corrective Action And Discipline**

1. If the Corp. VP of HR/RM or the Corp. EEO Officer decides to act on the report from the investigator the following conditions should be considered when determining corrective action:
  - The impact of the incident on the Complainant
  - The nature of the incident
  - The degree of aggressiveness and physical contact
  - The period of time and frequency of the incidents
  - The vulnerability of the Complainant
2. The following corrective actions may be considered depending on the particular incident and the factors in the previous paragraph:
  - Apology
  - Training
  - Referral to an assistance program
  - Reassignment or relocation
  - Report to a professional body
  - Suspension
  - Discharge
  - Legal action

## **Record Keeping**

The documents corresponding to the investigation will be kept on file in a secured location, separate from the Complainant and Respondent's personal files, for two (2) years from the date of the incident to be readily available for inspection by anyone directly affected by the incident, or an Occupational Health and Safety Officer.

The investigation report should be kept in a secured location for longer than two (2) years when it is reasonable to do so in the circumstances. Examples of reasonable circumstances include: to wait for the expiration of a limitation period, for the program manager to evaluate the workplace violence policy, and to monitor persons of ongoing concern.

### **False Accusations**

A person, who submits a complaint in good faith, even where the complaint cannot be proven, has not violated the policy.

If an investigation results in a finding that the Complainant falsely accused the Respondent of workplace violence knowingly or in a malicious manner, the Complainant will be subject to appropriate sanctions, including the possibility of termination. Such action is considered a violation of the policy, and the investigation results and any sanctions will be recorded in the company's personnel records relating to the Complainant.

### **Complaint Resolution Alternatives**

An individual affected by workplace violence has the right to pursue their concern through alternative forums such as mediation, or other forms of dispute resolution.

Nothing in this policy prevents an individual from pursuing other remedies to an incident of workplace violence such as a criminal or civil action.

### **Assistance**

A company member with questions, concerns or a complaint regarding workplace violence may contact the Corp. VP of HR/RM or the Corp. EEO Officer for help and advice. This information will be kept confidential except in the case of an imminent physical threat in the workplace.

### **Evaluation**

This policy will be reviewed on an annual basis to ensure that it conforms with any changes to the Occupational Health and Safety Act, Code and Regulations and that it continues to address the needs of the company regarding workplace violence. The evaluation should therefore include a needs assessment, process evaluation, and outcome evaluation.

### **Attached Exhibits**

#### **Exhibit A - Incident Report**

For the complainant to record a complaint.

#### **Exhibit B - Tips for Preventing and Managing Incidents of Violence or Harassment**

Covers the following areas: Dealing with a potentially violent person; Tips for non-verbal behavior and communication; Responding to a physical attack; Working off-site; Terminating a potentially abusive interaction.

**Exhibit A – Workplace Violence Incident Report Form**



**INCIDENT REPORT FORM**

**Complainant Information:**

\_\_\_\_\_

Last Name	First Name	Phone Number
-----------	------------	--------------

Date/Month/Year of Incident: \_\_\_\_\_

**Respondent Information:**

Name, if known: \_\_\_\_\_

Relationship:  Co-worker  Client  Supervisor  Member of Public  
 Other (Please Specify)

**Names of Witnesses and/ or those providing assistance:**

\_\_\_\_\_

Co- Worker  Client  Supervisor  
 Member of the Public  Other (Please Specify)

Co- Worker  Client  Supervisor  
 Member of the Public  Other (Please Specify)

**Description**

Give a thorough description of the incident (what happened, where it occurred, what led up to the incident, who else was present, what action was taken at the time, what impact the incident had on you.)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## **Exhibit B - Tips for Preventing and Managing Incidents of Violence or Harassment**

Tips for Preventing and Managing Incidents of Violence or Harassment Dealing with a potentially violent person

1. Tips for verbal communication:
  - Focus your attention on the other person to let them know you are interested in what they have to say.
  - Do not glare or stare, which may be perceived as a challenge.
  - Remain calm and try to calm the other person. Do not allow the other person's anger to become your anger.
  - Remain conscious of how you are delivering your words.
  - Speak slowly, quietly and confidently.
  - Speak simply.
  - Avoid communicating a lot of technical and complicated information when emotions are high.
  - Listen carefully. Do not interrupt or offer unsolicited advice or criticism.
  - Encourage the person to talk. Do not tell the person to relax or calm down.
  - Remain open-minded and objective.
  - Use silence as a calming tool.
  - Acknowledge the person's feelings. Indicate that you can see he or she is upset.
2. Tips for non-verbal behavior and communication:
  - Use calm body language - relaxed posture with hands unclenched, attentive expression.
  - Arrange yourself so that your exit is not blocked.
  - Position yourself at a right angle rather than directly in front of the other person.
  - Give the person enough physical space...this varies by culture, but normally 3 - 6 feet is considered an adequate distance.
  - Get on the other person's physical level. If they are seated try kneeling or bending over, rather than standing over them. Do not pose a challenging stance such as:
    - Standing directly opposite someone
    - Putting your hands on your hips
    - Pointing your finger
    - Waving your arms
    - Crossing your arms
  - Do not make sudden movements which can be seen as threatening.
  - Do not fight. Walk or run away. Get assistance from security or police.

Responding to a physical attack

If you are attacked:

- Make a scene, yell or scream as loudly as possible. Try shouting words like STOP, FIRE, or HELP.
- If you are being pulled along or dragged, fall to the ground and roll.

- Blow a whistle, activate your personal security alarm or push the security alarm.
- Give bystanders specific instructions to help you. Single someone out and send them for help. For example, “You in the yellow shirt, call the police.”
- If someone grabs your purse, briefcase or other belongings, do not resist. Throw the item to the ground several feet away from the thief and run in the opposite direction, yelling “help” or “fire”.
- Do not chase a thief.
- Run to the nearest safe place, a safe office or an open store.
- Call security or the police immediately after the incident.
- If the attack does not warrant calling the police, inform your supervisors or the authorities at your workplace.
- File an incident report.

#### Be Prepared

- Take a self-defense course
- Try to imagine yourself responding successfully to different types of attacks
- Practice your response

#### Working Off-Site

If you work away from a traditional office setting you must exercise extra caution. In many cases you have less or no ability to control your work environment. You may require special training to avoid violence by using conflict resolution and mediation tactics. Nevertheless, the following specific preventative tactics or procedures will minimize or prevent risks associated with working off-site:

- Have access to a cellular telephone or similar means of communication.
- Use an established check-in procedure that allows you to manage typical situations you may encounter off-site.
- Prepare a daily work plan so that you and others know where and when you are expected somewhere.
- Arrange to meet in a safe environment.
- Be alert and make mental notes of your surroundings when you arrive at a new or different setting.
- Use the “buddy system” especially when you feel your personal safety may be threatened.
- Determine under which circumstances unaccompanied visiting would involve unacceptable risk.
- Exercise your right to refuse to work in clearly hazardous situations.
- Disclose any feelings of discomfort or apprehension about an impending appointment to your supervisor.
- Do not enter any situation or location where you feel threatened or unsafe.
- Carry hand-held alarms, noise devices or other effective alarm devices.

#### When you are in unfamiliar premises:

- Check for escape routes and position yourself near an escape route.
- Mentally rehearse what you will do if an individual becomes aggressive or hostile.



Decide what your best preventative tactic will be.

- Take control of the seating arrangements. If possible, seat yourself near the door.
- Maintain a “reactionary gap” between you and the person - out of reach of the average person’s kicking distance. Increase the gap by sitting at a table. Be aware of the person’s proximity at all times.
- Be well prepared of an appointment. Review the available information about the individual(s) you are meeting.
- Terminate the appointment in a non-confrontational manner if the individual appears to be:
  - Intoxicated
  - Under the influence of drugs
  - Emotionally disturbed and threatening or out of control

Do not allow yourself to be backed into a corner. Leave a clear path to the exit. Do not venture too far into the premises e.g. remain near an exit. Do not turn your back on the person or enter a room first.

Terminating a Potentially Violent Interaction

- Interrupt the conversation firmly but politely
- Tell the person that you:
  - Do not like the tone of the conversation.
  - Will not accept such treatment.
  - Will end the conversation if necessary.
- Tell the person that you will ask them to leave the building, or that you will leave (if working off-site).
- If the behavior persists, end the conversation
- Ask the person to leave the building or leave yourself
- If the person does not agree to leave, remove yourself from the scene and inform your manager or supervisor immediately
- Do not return to the person if you believe they pose a physical threat
- Advise other staff and have them leave the immediate area
- Call security or your local police
- File an incident report



## Safety Program

E. Special Programs

Reviewed: January 4, 2019

Effective: May 30, 2001

## Ammonia Awareness

### Policy

The Boldt Company has implemented this program to ensure employees are informed of the chemical hazards of Ammonia in their workplace.

The Safety Department is the administrator of the Ammonia Awareness Program, and will document all necessary training of employees. Employees will be trained at the time of initial hiring in the safe use and handling of Ammonia they are required to use on the job.

Employees will be notified of any Ammonia used by any company other than The Boldt Company in the workplace and make Safety Data Sheets (SDS) available to employees.

### Responsibilities

We recognize that the responsibilities for safety and health are shared:

- The Boldt Company accepts the responsibility for leadership of the safety and health program, for its effectiveness and improvement, and for providing the safeguards required to ensure safe conditions
- Supervisors are responsible for developing the proper attitudes toward safety and health in themselves and in those they supervise, and for ensuring that all operations are performed with the utmost regard for the safety and health of all personnel involved, including themselves
- Employees are responsible for wholehearted, genuine operation with all aspects of the Safety and Health Program including compliance with all rules and regulations – and for continuously practicing safety while performing their duties

### Legal Standards

The OSHA standard for ammonia 50 parts per million (ppm) over an 8 hour day. The Boldt Company ensures that a worker's exposure will not exceed an average of 50 ppm over their 8 hour shift.

Most people can smell ammonia when it reaches a concentration of 20 to 30 ppm. Do not depend on your nose to tell you your workplace is safe. Ammonia may dull your sense of smell so that after a few minutes you cease to notice it.

### Ammonia

Ammonia is a colorless gas with a strong, irritating smell. It is widely used as a refrigerant in meatpacking, poultry, and other food processing plants.

At room temperature ammonia is a colorless, flammable gas with a pungent, suffocating odor. It becomes a clear, colorless liquid under increased pressure. Ammonia is usually shipped as a compressed liquid in steel cylinders. Anhydrous ammonia is the form used primarily in refrigeration and agriculture. Ammonia dissolves in water to form ammonium hydroxide, a corrosive solution. Concentrations of ammonium hydroxide vary from 5 percent to 10 percent for household use and 25 percent or more for industrial use.

## **Examples Of Ammonia On The Job**

Some examples of ammonia exposure on the job can include:

- Working on/near industrial refrigeration machinery rooms, equipment and/or piping
- Working in petroleum refineries
- Working with/near agricultural fertilizer

As a liquefied gas, ammonia is flammable. Sources of ignition usually include smoking or flames. Ammonia is considered a strong oxidizer. The Boldt Company will ensure that steps will be taken to separate ammonia and ammonia products from incompatible materials, such as:

- Copper
- Brass
- Bronze
- Galvanized steel
- Tin
- Zinc

If a fire occurs in the immediate vicinity of ammonia cylinders, remove them promptly if it can be done safely. If removal is not possible, cool cylinders by spraying with water. Do not extinguish flames as explosive re-ignition may occur. Allow the fire to burn out. If the fire cannot be brought under control, evacuate the area because of explosion hazards and toxic fumes.

## **Proper Handling And Storage**

The Boldt Company will train all employees before working with ammonia, employees will be trained in its proper handling and storage and know how to use the proper personal protective equipment. The Boldt Company will ensure that ammonia is stored in a cool, dry, well-ventilated area in tightly sealed containers protected from exposure to weather, extreme temperature changes, and physical damage.

Ammonia should be separated from:

- Oxidizers
- Combustible materials
- Heat, sparks, and open flame

## **Hazards Of Ammonia**

Ammonia leaks can be very dangerous. These leaks in the refrigeration pipes carrying ammonia to the coolers can endanger all workers in your plant; therefore, it is important to make sure you are protected when one occurs!

Ammonia is extremely irritating, and may severely burn your skin and eyes upon contact. If inhaled during a leak, a cloud of ammonia gas causes burning and swelling of the air passages of the nose, throat and lungs. Workers exposed to very serious leaks may survive the accident, but may die later from pulmonary edema, a buildup of fluid in the lungs caused by the damaging effect of the gas. Workers may suffer permanent lung and eye problems as a result of exposure to high levels of ammonia.

Exposure of the eyes to ammonia may cause burning, tearing, temporary blindness and severe eye damage. Exposure of the skin to ammonia may cause severe burns and blistering. Exposure of the respiratory tract (mouth, nose and throat) to ammonia may cause runny nose, coughing, chest pain, severe breathing difficulties, severe burns and death.

Nausea and water eyes from ammonia fumes pose an additional safety hazard to workers who must work with sharp knives and precision cutting equipment.

Not much is known about the long-term effects of ammonia. Frequent exposure to small amounts of other irritating gases can lead to bronchitis, persistent cough, and excess mucus production. It may also decrease your body's ability to get rid of foreign substances, like dusts, from your airways. Chronic (long-term) exposure to ammonia may, therefore, harm you by itself or in combination with other occupational hazards and infectious diseases.

### **Controlling The Hazards**

The Boldt Company ensures that all ammonia areas will be well-ventilated and posted with warning signs. Emergency exits will be well-marked and easy to get to. All ammonia tanks, lines, valves, and cylinders should be labeled, inspected frequently for leaks, maintained in a safe condition, and protected from trucks, forklifts, and other moving machinery.

Employees will never rely on respirators for day-to-day protection, but they should be available for emergencies. Keep them close to the work area they are useless in the plant manager's office. Never enter a confined space which might contain ammonia without an air-line respirator, a safety line, and a back-up worker with the same equipment.

The Boldt Company will require employees wear provided impervious clothing, gloves, face shields, and goggles available if there is a possibility of skin contact with liquid ammonia or vessels containing liquid anhydrous ammonia or aqueous solutions of ammonia containing more than 10% by weight of ammonia. Never wear contact lenses near ammonia they can trap the ammonia against your eyes.

Workers exposed to ammonia will have yearly medical exams by doctors of their own choosing--not by the company doctor. The Boldt Company will pay for the exams. Workers with lung, heart, or eye problems should be transferred to areas free from ammonia without loss of pay or other rights.

The Boldt Company will keep records of ammonia use, accidents involving ammonia, and maintenance of ammonia equipment. The records will be available to workers. All workers in ammonia areas will receive training in safe work practices, including drills for escape in case of accidents. Workers trained in first aid should always be on hand.

### **Site Specific Contingency / Emergency Plans**

The Boldt Company will provide all employees with a prepared site specific contingency/emergency plan. This plan will include where ammonia is used in the host facility and additional plant safety rules.

### **First Aid**

The Boldt Company will take these prompt actions if there is an ammonia spill or leak:

1. Remove the exposed person(s) to fresh air
2. Call 911 immediately and notify The Boldt Company
3. If the victim is contaminated with ammonia follow the steps for decontamination prior to administering first aid
4. If the victim is not breathing, begin artificial respiration
5. If the victim is breathing, place them in a seated position or lying down with the head and upper body in an upright position. Encourage slow, deep, regular breaths. Have a health professional administer oxygen as soon as possible
6. Keep the person warm and quiet
7. Seek medical attention. Persons with serious symptoms may need to be hospitalized

### **In Case Of An Ammonia Leak**

When a release of ammonia is detected, The Boldt Company will monitor the air with a direct reading device. If employees are not evacuated, air monitoring should be conducted during the entire release of ammonia. Initially, readings should be taken every five minutes. If an air monitoring reading, taken by direct reading method, detects ammonia at or above 25 ppm, employees will be evacuated from the affected area.

In case of emergency or a major leak, or if employees complain of health effects, call the fire department. The Boldt Company will not wait for air monitoring, but should immediately evacuate employees from the area. Employees not fully protected with appropriate personal protection equipment should not re-enter the area until air-monitoring indicates the ammonia level has fallen below 25 ppm and a second reading indicates that the level is falling.

The "Emergency Response Standard" issued by OSHA contains special protections for those-workers required to assist in dealing with a leak. See the UFCW fact sheet, "Protection from Ammonia Leaks: The Emergency Response Standard," for more information.

NOTE: Many companies have adopted a short-term level of 25 ppm as an evacuation trigger, though it is lower than the 50 ppm OSHA standard. This is a precautionary measure to prevent levels from exceeding the OSHA standard.

### **Decontamination**

Clothing or skin that is soaked with ammonia solutions may be caustic and expose rescuers, as well as victims, to vapors. To decontaminate:

1. Remove soaked clothing from the victim and double-bag it immediately
2. Flush exposed skin and hair with soap and water for 15 minutes, call a physician, and seek medical attention immediately if frostbite has occurred. Do not wash or rub skin
3. Flush exposed or irritated eyes with water or saline for 15 minutes. If the person is wearing contact lenses, try to remove them. See a physician/ophthalmologist immediately
4. For ingested ammonia, give the victim at least 2 glasses of water or milk immediately. Refer to SDS and call poison control center (1-800-848-6946), or call physician on instructions inducing vomiting

## Asbestos Awareness Training Program

### Objective

Employees who may contact asbestos containing material (ACM) or presumed asbestos containing material (PACM) must complete asbestos awareness training even if they don't disturb the ACM or PACM

This training provides awareness about the definition, types of asbestos fibers, and how they are measured. In addition, provide workers with the potential health effects of asbestos exposure, knowledge and proper protocol to protect themselves, and preventing exposure from occurring in the future.

### What The Participant Needs To Learn

- Understand the definition of asbestos including ACM and PACM.
- Become familiar with the types of asbestos fibers.
- Become familiar with the uses of asbestos and where it is found.
- Understand how a single fiber is measured.
- Understand how fibers in air are measured.
- Understand the diseases caused by asbestos.
- Understand concept of latency.
- Become familiar with the respiratory system.
- Understand how asbestos fibers damage the respiratory system.
- Understand why it is important to learn how to protect against asbestos disease.

### What Is Asbestos

Asbestos is a combination of minerals obtained from mines. Its ability to separate into thin, strong particles makes it highly suitable for use as a noncombustible, non-conducting, and chemically resistant material. In its natural state, asbestos is a fluffy, fibrous material.

ACM is any material containing more than one percent of asbestos. PACM is thermal insulation and surfacing material in buildings built before 1981 that hasn't been tested to not have asbestos.

### Types Of Asbestos Fibers

- Chrysotile
- Amosite
- Crocidolite
- Tremolite
- Actinolite
- Anthophyllite Definitions
- The first 3 types are used most commonly in building products.
  - a. Chrysotile
    1. These fibers are whitish in color.
    2. This is the most common type in construction.
    3. It doesn't have iron in it.

- b. Amosite
  1. This is brown in color.
  2. Primarily used on elbows and around boilers.
  3. This has meddle-like fibers.
  4. Crocidolite
- This is blue in color.
  - Tremolite, Actinolite, & Anthophyllite belong to the amphibole group (complex silicate minerals with crystal-like structures that contain calcium, sodium, manganese, magnesium, aluminum, and iron ions or a combination of them).
- Uses
  - Fire protection, insulation
  - Wrapping of boilers, hot water, and steam pipes (lagging).
  - Textiles
- Location - The majority of buildings built in the U.S. between about 1930 and 1976.
  - Schools, hospitals, offices, homes, etc.

How asbestos is measured.

- Fibers are too small to see; need a microscope.
- Can stay in the air for many hours.
- Length of fiber is measured in micrometers (um).

One-thousandth of a millimeter; a millimeter is about the thickness of a dime.

- Definition of fiber - according to OSHA, any particle whose length is greater than or equal to five (5) micrometers and an aspect ratio (length to width ratio) of greater than or equal to three to one (3 to 1).

How asbestos fibers are measured in air.

- Levels of fiber in air = fiber concentration.
- Measured by counting the fibers present in a certain volume of air (in cubic centimeters).
- OSHA Permissible Exposure Limit (PEL) = 0.1 fibers per cubic centimeter (f/cc) of air measured as an 8 hour time-weighted average (TWA).

A cubic centimeter is about the size of a dime.

### List Of Suspect Asbestos-Containing Materials

Cement Pipes	Elevator Brake Shoes
Cement Wallboard	HVAC Duct Insulation
Cement Siding	Boiler Insulation
Asphalt Floor Tile	Breeching Insulation
Vinyl Floor Tile	Ductwork Flexible Fabric Connections
Vinyl Sheet Flooring	Cooling Towers
Flooring Backing	Pipe Insulation (corrugate air-cell, block)
Heating and Electrical Ducts	Construction Mastics (floor tile, carpet, ceiling tile, etc.)
Acoustical Plaster	Electrical Panel Partitions
Decorative Plaster	Electrical Cloth
Textured Paints/Coatings	Electric Wiring Insulation
Chalkboards	Ceiling Tiles and Lay-in Panels
Spray-applied Insulation	Roofing Shingles
Blown-in Insulation	Roofing Felt
Fireproofing Materials	Base Flashing

Taping Compounds (thermal)	Thermal Paper Products
Fire Doors	Packing Materials (for wall/floor penetrations)
High Temperature Gaskets	Caulking/Putties
Laboratory Hoods/Table Tops	Adhesives
Laboratory Gloves	Wallboard
Fire Blankets	Joint Compounds
Fire Curtains	Vinyl Wall Coverings
Elevator Equipment Panels	Spackling Compounds

NOTE: This list does not include every product/material that may contain asbestos. It is intended as a general guide to materials that may contain asbestos.

## Health Effects Of Asbestos

Diseases related to asbestos exposure:

- Asbestosis - scarring of lung tissue that may become so severe that the body is not able to get enough oxygen. Asbestosis can be detected by a chest X-ray.
- Lung Cancer - malignant tumor in the lungs. People working with asbestos are subject to about 5 time's greater risk of contracting this disease than people who don't work with asbestos. Smokers working with asbestos increase their risk by about 50 times.
- Pleural Mesothelioma - malignant tumor of the lining of the chest or abdominal cavity.
- Gastrointestinal Cancer - tumors in parts of the digestive tract, esophagus, stomach, colon, or pancreas. It is still controversial whether or not asbestos causes this disease.
- Asbestos Corns or Warts - result from chronic irritation of the skin by asbestos fibers. Usually found on the hands. Not believed to lead to skin cancer.

Risk of getting asbestos disease:

- This is related to:
  - a. level of asbestos exposure
  - b. length of asbestos exposure
  - c. smoking habits

When the symptoms appear:

- Latency period - time from first exposure until the beginning of symptoms. Could be from 10-40 years or greater.

How much asbestos exposure is hazardous

- Lungs bring in oxygen and give off carbon dioxide
- Air contains oxygen, but it also contains dust such as asbestos fibers
- As air is inhaled it goes to:
  - Nose and/or mouth

Hairs in nose filter large dust particles.

- Pharynx and trachea (wind pipe)
- Each of the two branches of the bronchial tubes
- Each bronchial tube branches smaller and smaller and ends in tiny air sacs or alveoli



Asbestos fibers can reach all parts of the lung.

- Fibers deposited in the upper parts of the lung may be cleared by:
  - Coughing
  - Cilia - tiny hairs that move mucous, containing fibers, out of the lung
  - Fibers deposited in the lower part of the lung may be cleared by large cells called macrophages that surround and remove them

Macrophages (pronounced mac-row-fa-ges) are large cells in the tiny air sacs of the lung that surround and "digest" dirt.

How asbestos affects the respiratory system:

- Asbestos fibers often kill the macrophages so that they cannot effectively remove the fibers.
  - This makes scar tissue in the lung
- Scarring process is long and slow and can lead to asbestosis.

Fibers can lodge in the chest or abdominal lining causing pleural mesothelioma. Can have 30-40 year latency.

Fibers can lodge in respiratory or digestive tract and cause lung, esophagus, stomach, colon, or pancreatic cancer.

The chance of getting lung cancer is 50 times greater if exposed to asbestos and smoking than if working with asbestos and not smoking.

- Danger of working with asbestos varies with:
  - Intensity of exposure
  - Individual susceptibility
  - Fiber size (very fine, short fibers are most dangerous)
  - Presence of other pollutants

### **Exposure Limits**

"Action Level" means an airborne concentration of asbestos of 0.1 fiber per cubic centimeter (f/cc) of air calculated as an 8-hour time-weighted average.

"Permissible Exposure Limit" means no employee shall be exposed to an airborne concentration of asbestos in excess of 0.1 fibers per cubic centimeter of air as an 8-hour time-weighted average.

"Ceiling Excursion" means an airborne concentration of asbestos of 1.0 f/cc of air calculated in a 30-minute time frame.

1 f/cc = 28,300 f/cu. ft.

.1 f/cc = 2,830 f/cu. ft.

.2 f/cc = 5,660 f/cu. ft.

Employees will not disturb ACM or PACM. Signs and labels will be used to identify known materials and employees will be taught proper work practices to recognize and avoid disturbing the material.

When working on a multi-contractor worksite, Boldt employees will be protected from asbestos exposure. This may mean removing employees if there is inadequate containment or enclosure breach of a Class I asbestos job, until the hazard is fixed or an exposure assessment shows there is no exposure.

## **Important Points About Asbestos Awareness**

Inhalation of asbestos fibers has been shown to cause asbestosis, lung cancer, and mesothelioma. Much of our knowledge of these health effects has come primarily from studies of workers exposed routinely to very high levels of asbestos in their jobs.

- Information on health effects of low-level asbestos exposure is less certain.
- Three of the six naturally occurring asbestos minerals - chrysotile, amosite, and crocidolite - have been most commonly used in building products.
- Asbestos became a popular commercial product because of its strength, heat resistance, corrosion resistance, and thermal insulation properties.
- Asbestos-containing materials (ACM) are regulated by EPA, OSHA, and the Consumer Product Safety Commission (CPSC), and individual state and local agencies.
- Friable ACM can be found in about 70,000 public and commercial buildings. Many areas where asbestos is found are not accessible to the general public.
- Some common uses of asbestos have included pipe/boiler insulation, spray-applied fireproofing, floor and ceiling tile, cement pipe/sheeting, and paper pipe wrap.
- Positive identification of asbestos requires laboratory analysis; information on labels or visual examination by itself is not sufficient.
- Intact, undisturbed materials generally do not pose a health risk; they may become hazardous when damaged, disturbed, or deteriorated over time, resulting in fibers being released into building air. Friable - easily crumpled or pulverized; this is the type that can easily become airborne.
- Non-friable asbestos containing material (not easily crumpled by hand or remains structurally intact) is removed very differently than friable asbestos containing material. The method typically doesn't include an air-tight enclosure as required when abating friable asbestos. This has limited exposure unless changing the composition of the material containing the asbestos material.
- Any material that is suspected to contain or is presumed asbestos containing material (PACM), cannot be disturbed/removed until verified whether the material contains asbestos or not. At that time, necessary precautions must be made to eliminate potential exposure.

## **Known Facts On Asbestos**

- Widespread use of asbestos didn't begin until 1878, when huge deposits of asbestos were discovered in an open pit mine located in the Canadian Province of Quebec. Today, the town near that mine is still known as Asbestos.
- The Emperor Charlemagne impressed dinner guests by tossing an asbestos tablecloth into a fireplace to clean it.
- Besides certain industrial products, the only remaining asbestos products exempt from the EPA ban are asbestos thread, tape packing material, and liners for missiles.
- The ancient Romans used asbestos for making lamp wicks and funeral cloths for cremation wrappings.
- Despite costs totaling in the billions, 70 percent of Americans feel the cost to control or remove asbestos from public buildings is justified, according to a National Asbestos Council survey.
- The snowflakes used as backdrops in the Bing Crosby film "White Christmas" were pure asbestos.

## Benzene Exposure Management Program

### Introduction and Scope

The Occupational Safety and Health Administration's (OSHA) Benzene Standard, 29 CFR §1910.1028, became effective on December 10, 1987. The intent of the Benzene Standard is to protect employees against harmful over-exposures to benzene through inhalation, skin contact or eye contact. The rule making effort is based on studies that indicate long-term exposure to benzene causes leukemia, a cancer of the blood-forming organs, in humans and may cause various blood disorders.

Benzene is a clear, colorless, toxic, flammable liquid with a pleasant, sweet odor. Benzene is an aromatic hydrocarbon that is produced by the burning of natural products and is not soluble in water. It is also a component of products derived from coal and petroleum. It is found in gasoline and other fuels, and is used in the manufacturing of plastics, detergents, pesticides and other chemicals.

The potential for benzene exposure may occur on our work sites. Boldt's Benzene Exposure Management Program includes a summary of permissible exposure levels, exposure monitoring and training, medical surveillance and medical removal, record keeping, regulated areas, hazard communication, emergency procedures, primary reliance on engineering and work practices to control exposure and maintenance and selection of personal protective equipment.

### Responsibilities

Boldt's Safety Department has the primary responsibility for ensuring that personnel are trained. Ultimately, each employee is responsible for being knowledgeable about the hazardous materials they work with and complying with applicable institutional, local, State, and Federal regulations. Each employee must be aware of the site specific emergency plans. However, the Boldt Safety Department will assist supervisors to adequately protect employees from potential occupational exposures to benzene and to achieve regulatory compliance with the OSHA requirements by:

- Identifying locations where exposure to benzene is possible;
- Evaluating the airborne concentration of benzene in areas at higher risk for over-exposure; and
- Educating employees about the risks of over-exposure, and safe handling and use of benzene.

### Exposure Control

#### Exposure Limits

OSHA sets Permissible Exposure Limits (PEL) for many chemicals. The PEL is the allowable exposure that an employee can be exposed to over an eight-hour time weighted average. The current PEL for benzene is 1 part benzene per million parts air (ppm). Since this is an 8-hour average, short-term exposures above the PEL are permitted as long as the average exposure over an 8-hour period does not exceed the PEL.

However, OSHA has set a Short Time Exposure Limit (STEL) for benzene that cannot be exceeded. The STEL is the greatest concentration of benzene in air to which exposure may occur for a fifteen-minute period. The current STEL is 5 ppm.

The action level is 0.5 ppm, measured over 8 hours. At this level, certain provisions of the standard, such as employee exposure monitoring and medical surveillance, are initiated. The action level is set lower than the PEL to better protect against overexposure.

#### Effects of Exposure

Benzene is a known human carcinogen and causes various blood disorders. It may affect the body through accidental ingestion, inhalation, skin contact, and/or eye contact.

#### Effects of Short-Term (Acute) Exposure

If ingestion is the route of exposure, benzene may cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhaling benzene vapors may cause respiratory tract irritation. Exposure may cause adverse central nervous system effects including headache, convulsions, and possible death. Inhalation may also cause drowsiness, unconsciousness and central nervous system depression. Central nervous system effects may include confusion, ataxia, vertigo, tinnitus, weakness, disorientation, lethargy, drowsiness and finally coma. Inhalation of benzene vapors may also lead to irreversible bone marrow injury, and aplastic anemia. Benzene may be absorbed through the lungs.

Skin absorption (dermal) can result in irritation. Direct contact with benzene may cause erythema (redness) and vesiculation (blistering). Prolonged or repeated contact has been associated with the development of dry, scaly dermatitis or with secondary infections. Accidental splashes into the eyes may cause severe eye irritation and slight transient injury.

Employees must immediately report to their supervisor any adverse signs or symptoms that are suspected to be attributable to benzene exposure.

#### Effects of Long-Term (Chronic) Exposure

The Department of Health and Human Services has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs. Chronic exposure may cause bone marrow abnormalities with damage to blood forming tissues and anemia. Prolonged or repeated exposure may cause adverse reproductive effects. Animal studies have reported fetotoxicity, degenerative effects in a developing fetus or embryo; and teratogenicity, malformations to an embryo or fetus.

#### Exposure Determination and Monitoring

The Boldt Safety Department has the responsibility for initial and periodic monitoring for each job that has a potential of a benzene exposure. This monitoring will be conducted by a third party monitoring contractor. Initial monitoring will consist of identifying employees who may be exposed at or above the action level or STEL. This monitoring process will be repeated each time there is a change in production, equipment, process, personnel or control measures which may result in new or additional exposure to benzene.

Employees will be able to observe any monitoring under this program. When observation of the measuring or monitoring of employee exposure to benzene requires entry into areas where the use of protective clothing, equipment or respirators is required, Boldt supervision must ensure that the observer uses such protective devices and complies with all other applicable safety and health procedures.

The frequency of monitoring will be determined by the results of the initial monitoring. The frequency is summarized in the following table.

**Table 1**

<b>Results</b>	<b>Frequency</b>
Less than the action level (0.5 ppm) twice within 7 days	May discontinue monitoring
At or above the action level (0.5 ppm), and at or below the PEL (1 ppm)	Annual
Above the PEL (1 ppm)	Semi-annual*

Monitoring for the STEL will be repeated as necessary to evaluate exposures of employees subject to short-term exposures.

The Boldt Safety Department will ensure that personal and area air monitoring is conducted in accordance with OSHA’s sampling and analytical method 12, and/or the National Institute for Occupational Safety and Health (NIOSH) recommended methods and that samples are analyzed by an AIHA accredited laboratory. Monitoring techniques will be accurate, at the 95% confidence level, to within plus or minus 25% for airborne concentrations at the PEL (1 ppm) and STEL (5 ppm); and to within plus or minus 35% at the action level (0.5 ppm).

Affected employees will be notified, in writing, within 15 working days after receipt of the monitoring results, either individually or by posting the results at a location that is accessible to affected employees. If the PEL is exceeded, the written notification must contain the corrective action being taken by the department to reduce employee exposure to or below the PEL.

**Method of Compliance**

Boldt Safety Supervision will institute administrative, engineering and work practice controls to reduce and maintain employees’ exposure to benzene at or below the PEL and STEL. If these controls cannot reduce employees’ exposure below the permissible exposure limits, respiratory protection will be provided to reduce employee exposure to or below the PEL.

Any employee(s) who may be required to wear a respirator or chooses to wear one during certain operations is required to participate in the ***Boldt Respiratory Control Program*** as required by OSHA’s Respiratory Protection Standard, 29 CFR § 1910.134.

Protective clothing and equipment resistant to benzene must be provided to employees by their department. Skin and eye contact can be prevented by the use of chemical protective clothing made of material impervious to benzene and the use of other personal protective equipment, such as gloves, goggles and face shields, as appropriate to the operation.

Supervisors will ensure that all protective clothing is clean, laundered and repaired and/or replaced to maintain its effectiveness. The supervisor will be responsible for the safe disposal of this clothing and equipment.

Boldt supervisors will ensure that safety showers and eyewash facilities are located and within the immediate work area for emergency use if there is any possibility that an employees' skin or eyes may become splashed with benzene solutions.

## **Communication of Hazards to the Employee**

### Information and Training

The Boldt safety supervisor will conduct training for employees who are assigned to workplaces where there is a potential for exposure to benzene. This training must occur prior to or at the time of initial assignment, and whenever a new exposure to benzene is introduced into the work area. The training will be repeated annually thereafter if exposures are above the action level.

The training program will be conducted in a manner which the employee is able to understand and will include:

- Requirements of OSHA's Benzene Standard and information available in Appendices A and B of the standard as well as how to access or obtain a copy of it in the workplace;
- Description of the medical surveillance program and the information contained in Appendix C of OSHA's Benzene Standard; and
- Information on the quantity, location, manner of use, release and storage of benzene and the specific operations in the workplace that could result in exposure to benzene.

The supervisor will inform all affected employees of the location of written training materials and will make these materials readily available, without cost, to the affected employees.

### Labeling and Safety Data Sheets

Boldt supervisors will ensure that hazard-warning labels are affixed to all containers of benzene, which must include the following:

DANGER  
CONTAINS BENZENE  
CANCER HAZARD

As with all chemicals, a Safety Data Sheet (SDS) must be readily assessable in the Boldt office trailer.

### Regulated Areas

In areas where the concentrations of airborne benzene exceed the PEL and STEL, all entrances and access-ways will be posted with signs bearing the following information:

DANGER  
  
BENZENE  
  
CANCER HAZARD  
  
FLAMMABLE - NO SMOKING  
  
AUTHORIZED PERSONNEL ONLY  
  
RESPIRATOR REQUIRED

Only those employees who have been trained to recognize the hazards of benzene will be allowed to enter these areas.

## **Emergency Procedures**

In order to prevent emergencies in those areas using benzene, Boldt supervisors will establish a procedure to detect leaks and spills, including regular visual inspections and preventative maintenance on equipment. Supervisors will ensure that spills are reported, contained and cleaned up promptly, only by those individuals wearing suitable personal protective equipment and who are trained in proper methods of cleanup and decontamination. There will be no smoking in regulated areas and firefighting equipment (fire extinguishers) must be readily available in the immediate work area. Any benzene-

generated waste must be appropriately contained and labeled. If the spill may lead to employee overexposure, the supervisor must contact Environmental Health & Safety to perform area or personal monitoring to ensure that exposures have returned to the level that existed prior to the incident. Employees who discover or are involved in emergencies involving benzene are responsible for notifying the appropriate authorities and following established protocol.

### **Medical Surveillance**

Medical surveillance programs for all employees exposed to benzene at concentrations at or exceeding the action level on 30 or more days per year, or exceeding the PEL or STEL for 10 or more days per year.

All medical procedures, including administration of medical disease questionnaires, will be performed by or under the supervision of a licensed physician and will be provided without cost to the employee, without loss of pay, and at a reasonable time and place. An accredited laboratory will conduct all laboratory tests.

Initial medical surveillance must occur prior to assignment to a job. The initial examination must consist of the following elements:

- A detailed occupational history which includes:
  - Past work exposure to benzene or any other hematological toxins;
  - A family history of blood dyscrasias including hematological neoplasms;
  - Blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;
  - Renal or liver dysfunction;
  - Medicinal drugs routinely taken;
  - Previous exposure to ionizing radiation; and
  - Exposure to marrow toxins outside of the current work situation;
- A complete physical examination;
- Laboratory tests, which must consist of a complete blood count including a leukocyte count with differential, a quantitative thrombocyte count, hematocrit, hemoglobin, erythrocyte count, and erythrocyte indices (mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and MCH concentration (MCHC)). The examining physician will review the results of these tests;
- Additional tests as necessary in the opinion of the examining physician, based on alterations to the components of the blood or other signs which may be related to benzene exposure; and
- The physical examination must pay special attention to the cardiopulmonary system and shall include a pulmonary function test for all employees required to wear respirators for at least 30 days a year.
- The department will provide each affected employee with a medical examination annually following the initial examination. These periodic examinations must include at least the following elements:
  - A brief history regarding any new exposure to potential marrow toxins, changes in medicinal drug use and the appearance of physical signs relating to blood disorders;
  - A complete blood count including a leukocyte count with differential, quantitative thrombocyte count, hemoglobin, hematocrit, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC); and
  - Appropriate additional tests as necessary, in the opinion of the examining physician, in consequence of alterations in the components of the blood or other signs which may be related to benzene exposure.
- In addition to the monitoring required above, if an employee is exposed to benzene in an emergency situation, the department will have the employee provide a urine sample at the end of the employee's shift and have a urinary phenol test performed on the sample within 72

hours. The urine specific gravity shall be corrected to 1.024. If the result of the urinary phenol test is below 75 mg phenol/L of urine, no further testing is required. If the result of the urinary phenol test is equal to or greater than 75 mg phenol/L of urine, the department will provide the employee with a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a duration of three (3) months following the emergency exposure.

- If the results of the complete blood count required for the initial, periodic and emergency examinations indicate any of the following abnormal conditions exist, then the blood count shall be repeated within 2 weeks:
- The hemoglobin level or the hematocrit falls below the normal limit [outside the 95% confidence interval (C.I.)] as determined by the laboratory for the particular geographic area and/or these indices show a persistent downward trend from the individual's pre-exposure norms, provided these findings cannot be explained by other medical reasons;
- The thrombocyte (platelet) count varies more than 20 percent below the employee's most recent values or falls outside the normal limit (95% C.I.) as determined by the laboratory; and
- The leukocyte count is below 4,000 per mm<sup>3</sup> or there is an abnormal differential count.
- If the abnormality persists, the examining physician shall refer the employee to a hematologist or an internist for further evaluation unless the physician has good reason to believe such referral is unnecessary. The hematologist's or internist's evaluation shall include a determination as to the need for additional tests, and the department will assure that these tests are provided.

The supervisor will provide the following information to the examining physician:

- A copy of OSHA's Benzene Standard
- A description of the affected employee's duties as they relate to the employee's exposure to benzene;
- The employee's actual or representative exposure level;
- A description of any personal protective equipment used or to be used; and
- Information from previous employment-related medical examinations of the affected employee which is not otherwise available to the examining physician.
- The examining physician must provide a written opinion to the department administrator that contains the results of the affected employee's medical examination within 15 days of the examination. The written opinion should be limited to the following information:
- The occupationally pertinent results of the medical examination and tests;
- The physician's opinion concerning whether the employee has any detected medical condition(s) that would place the employee's health at increased risk of material impairment from exposure to benzene;
- Any recommended limitations upon the employee's exposure to benzene, including removal from benzene exposure, or upon the employee's use of respirators, protective clothing, or other protective equipment; and
- A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from benzene exposure which require further explanation or treatment.
- The written opinion obtained by the department will not reveal specific records, findings, and diagnoses that have no bearing on the employee's ability to work in a benzene-exposed workplace.



### Medical Removal Plan

When a physician refers an employee to a hematologist/internist, the affected employee will be removed from areas where exposures to benzene may exceed the action level until being evaluated by the hematologist/internist. Following the examination, a decision will be made with the primary physician to allow the employee to return to areas where benzene exposure is above the action level or remove the employee from those areas. This decision will be reported, in writing, to the department and the employee. In the case of removal, the physician will state the required probable duration of removal from occupational exposure to benzene above the action level and the requirements for future medical examinations to review the decision.

For any employee that is removed, the department will provide a follow-up examination where the physician, in consult with the hematologist/internist, will decide within six months of the date the employee was removed as to whether the employee will be returned to the usual job or whether the employee should be removed permanently.

### **Record Keeping**

The Boldt Safety Department will maintain an accurate record of the following:

- Exposure measurements, which must be maintained for at least thirty years, including:
  - The dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;
  - A description of the sampling and analytical methods used;
  - A description of the type of respiratory protective devices worn, if any; and
  - The name, social security number, job classification and exposure levels of the employee monitored and all other employees whose exposure the measurement is intended to represent.
- Medical surveillance records, which will be maintained for the at least the duration of the employment plus thirty years, including:
  - The name and social security number of the employee;
  - The department's copy of the physicians written opinion on the initial, periodic and special examinations, including results of medical examinations and all tests, opinions and recommendations;
  - Any employee medical complaints related to benzene exposure;
  - A copy of the information provided to the physician; and
  - A copy of the employee's medical and work history related to exposure to benzene or any other hematologic toxins.

Upon request, The Boldt Company will make available all records maintained as a requirement of this policy for examination and copying to OSHA. In addition, employee exposure and medical records required by this policy shall be provided upon request for examination and copying, to the subject employee or former employee or to anyone having the specific written consent of the subject employee or former employee.

### **Plan Evaluation**

The effectiveness of this plan will be evaluated periodically using the criteria listed below:

- Maintain compliance with applicable institutional, local, State and Federal regulations;
- Maintain 100% participation in mandatory laboratory safety training;
- Processes involving benzene are evaluated at least annually;
- Periodic personal and area air monitoring is conducted in accordance with OSHA and/or NIOSH recommended methods and samples are analyzed by an AIHA accredited laboratory; and
- Maintain exposures below applicable limits or provide appropriate protection.



## Safety Program

E. Special Programs

Reviewed: January 4, 2019

Effective: May 16, 2001

## Blood borne Pathogens Infection Control

### Scope

It is the purpose of The Boldt Company to establish a written control plan to eliminate or minimize the health risk of workplace exposure to potentially infectious material, such as blood borne pathogens, but not limited to Hepatitis B virus (HBV) or Human Immunodeficiency Virus (HIV). Included in this plan will be an explanation of policies, procedures, common work practices, and proper protective equipment.

### Determination

The infection control plan will include "designated" Boldt employees certified in AED (automated external defibrillator)/CPR (cardiopulmonary resuscitation) who may be involved in a rescue and/or clean-up scenario. Also included will be any employee who has an unprotected exposure to blood or other potentially infectious material and who is not reasonably expected to provide services beyond their job duties.

### Training Requirements

- Training of personnel must be completed and formally documented (dates and contents of training, names and job titles of persons attending). These must be maintained at least three years. All documentation must be forwarded to Boldt's Corporate Office. All medical and training records will be maintained in the Corporate Office. The Safety Department has the overall responsibility for the effectiveness of the program.
- All training and medical assistance will be provided at no cost to employees.
- Administered by qualified individual(s).
- Copies of the following must be readily accessible:
  - Federal Standards
  - Boldt's Blood borne Pathogens Infection Control Program

### Ppe - Personal Protective Equipment

PPE is supplied in first aid kits, located at each job site.

All PPE is disposable and is to be used only once! Replacements can be requested through Boldt's Safety Department.

AED and CPR certified employees will have access to PPE, such as barriers, and body fluid disposal kits. They will be trained in proper use and disposal of the following PPE:

- Disposable Latex Gloves (6 pair)
- Mouth Guard Barrier w/One-Way Valve, such as the Micro-Shield (disposable)
- Body Fluid Spill Kit

### Contents:

- 1 scoop
- 1 red biohazard bag
- 1 white bag

- 1 disposable dry towel
- 2 twist ties
- 1 sani-cloth
- 1 moist antiseptic towelette
- 1 package of chlorinated absorbent beads

Use Instructions:

- Make sure emergency medical services have been summoned.
- Eyeglasses with side shields must remain in use by the responding individual(s).
- Put on the latex disposable gloves immediately!
- If necessary, administer first aid, CPR, or if available utilize an AED.
- Only designated personnel may clean up the biohazard site.
- Completely read and follow the directions within the body fluid spill kit.
- Dispose of all materials (sani-cloth, white bag, scoop, disposable towel, used packet, gloves, etc.) in the red "Biohazard" labeled bag and secure with tie. This includes any saturated clothing or PPE.
- Wipe hands with antiseptic towel. Allow to air dry.
- Contact Boldt's Safety Department for proper disposal procedures.

**Engineering Controls**

Hand Washing Facilities:

- Appropriate hand cleanser (e.g., "go jo" hand cleaner) in conjunction with clean cloth/paper towels or antiseptic towel must be readily accessible.
- Hands must be washed with soap and running water as soon as feasible after an exposure.

Eye Wash Facilities (portable):

- There are two bottles of sterile isotonic eyewash that are to be used in case of an eye emergency.
- This is to be administered immediately, followed by an eyewash facility when one is made available.

Red Bags/Containers - BIOHAZARD:

- Red bags/containers with proper labels must be used for disposal methods
- Appropriate containers must also be provided and labeled for any "sharps"

Laundry Controls:

- Soiled/wet PPE and clothing must be placed in a leak-proof\* biohazard bag with proper labeling
- Fluid spills and disposable PPE/clothing may be disposed of together (same container)

\*If a container breaks or has contaminants on the outside of it, it must be double-bagged to ensure that it will not constitute an exposure hazard.

Disposal Methods:

- Small amounts of contaminated waste (e.g., blood, body fluids, etc.) may be disposed of in a regular garbage/trash container if it has been properly decontaminated following these guidelines
  - a. Mix one part bleach per 10 parts water. Approximately one-half cup per gallon.
  - b. Add contaminated waste material to the mixture. Fully soak and cover the material.
  - c. Allow a minimum of 12 hours for the decontamination process.
  - d. Bleach solution can be poured down the drain.

- e. Rinse waste material with water prior to disposing in regular garbage. Allow to air dry.
- f. Double-bagging or labeling "Biohazard Waste" is not necessary after proper chemical decontamination.

## **Work Control Practices**

### Universal Precautions:

- All body fluids will be considered a potential hazard that may contain harmful contaminants, such as HIV, HBV, and other blood borne pathogens.
- Done to control the spread of infection. Gloves and eyeglasses with side shields must be worn at all times when coming into contact with all body fluids and other potentially infectious material (OPIM).

Only designated personnel may clean up "hazard" site and dispose of the contaminated material. (Follow body fluid spill kit procedures and disposal methods.)

Boldt employee is required to wash skin/hands after removal of PPE, after clean-up/disposal of contaminated material, and after an exposure has taken place. Wash all affected parts!

The disposable mouth guard barrier, such as a Micro-Shield, with one-way valve must be used when administering CPR or other respiratory functions, and disposed of properly in a color-coded bio-hazard bag/container. It is only to be used once.

Eating, drinking, smoking, touching contact lenses, etc. are prohibited in the immediate contaminated area and also in the area where first aid has been administered. Storage of food/drink is also prohibited.

## **Vaccination**

HBV vaccinations along with a single dose of HBIG (hepatitis B immune globulin) will be made available to an employee who has an occupational exposure to blood, body fluids, or OPIM, provided that it can be done within seven (7) days of the exposure. Before the vaccine series can be administered, blood tests need to be performed on each individual to determine HBV/HIV status. A consent form must be filed for these tests, which will be offered at no cost to the employee, along with the vaccine series.

### Consultation will be offered regarding:

- Effectiveness (% failure, booster, etc.)
- Method of administering
- Side effects
- Any additional pertinent information

Declination form must be signed if an employee refuses to be vaccinated at this time, but the employee may opt to receive the vaccination at a later date at no cost to the employee.

## **Post-Exposure Procedures**

Employee or supervisor must immediately report an exposure/incident to Boldt's Safety Department.

### Boldt's Procedures:

- Medical evaluation, consultations, procedures, and vaccination series will be administered by a designated health care professional (HCP) or physician.
- Documentation on the OSHA Log, when applicable.
- Provide health care professional with:

- a. Boldt's Blood borne Pathogens Infection Control Plan
- b. OSHA Blood borne Pathogen Standard
- c. Incident report (circumstances, route of entry, etc.)
- d. Job description of employee(s) affected
- e. Employee's HBV/HIV status
- f. Employee's HBV vaccine status
- g. Other relevant medical information.
- Inform affected employee(s) within 15 working days of receipt of health care professional's written opinion regarding the exposure.

Health Care Professional's Procedures:

- Confidential information
  - a. Evaluation of incident/exposure.
  - b. Arranges HBV and HIV testing for affected employees and source individual (permission required). Documentation must be noted if employee declines.
  - c. Notifies employee(s) of all results from testing.
  - d. Provides counseling to affected employee(s).
- Written Opinion (received within 15 working days).
  - a. Documentation that employee(s) were informed of evaluation results and any necessary follow-up procedures.
  - b. Whether HBV vaccine is indicated or received
  - c. Specific diagnosis Recordkeeping Training.

Include the following information:

- a. Month/Day/Year of session.
- b. Place of training session.
- c. Contents/summary of training session
- d. Name of person(s) conducting the training session
- e. Names and job titles of all persons attending training session
- f. Copy of Federal Standards.
- g. Copy of Boldt's Blood bore Pathogens Infection Control Plan.
- h. Records must be maintained for duration of employment plus 30 years.

Medical. Exposures will include the following information:

- a. Name and Social Security number of employee.
- b. Copy of employees HBV vaccination status:
  - 1. Date of vaccination
  - 2. Medical examination records
  - 3. Declination form (if needed).
  - 4. Refusal of blood testing
  - 5. Copy of all results, examinations, testing, and follow-up procedures from the treating health care professional (HCP).
  - 6. Copy of HCP's written opinion of the medical evaluation.
  - 7. Records shall be maintained for duration of employment plus 30 years.
  - 8. Records are confidential and cannot be disclosed without the employee's expressed written consent to any person within or outside the workplace, except as required by law.

## **DEFINITIONS**

**BLOODBORNE PATHOGEN:** Any microorganism that is present in human blood and can cause disease in humans. In addition to HBV and HIV, there are diseases such as malaria, syphilis, and hepatitis C.

**OTHER POTENTIALLY INFECTIOUS MATERIALS (OPIM):** (1) Human body fluids - cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva, semen, vaginal secretions, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Unfixed tissue or organs from a human, either living or dead.

**OCCUPATIONAL EXPOSURE:** Reasonably anticipated skin, eye mucous membrane, or "parenteral" (piercing) contact with blood or "other potentially infectious materials" that may result from the performance of an employee's duties.

# Exhibit A – Hepatitis B Vaccine Declination Form



## HEPATITIS B VACCINE DECLINATION FORM

I understand that due to my occupational exposure to blood or other potentially infectious materials, I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If, in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

NAME: \_\_\_\_\_  
(print)

SIGNATURE: \_\_\_\_\_

SS #: \_\_\_\_\_

DATE: \_\_\_\_\_

WITNESS NAME: \_\_\_\_\_  
(print)

WITNESS SIGNATURE: \_\_\_\_\_





## Confined Space Entry

### Purpose

To provide maximum protection for employees assigned to enter and work in confined spaces.

### Training

Confined space training must be given to every employee involved in the confined space entry process before their first confined space assignment. Training must include hazard recognition, signs and symptoms of exposure to the hazard, communication system, required personal equipment, emergency/rescue procedures, air monitoring, and ventilation methods in use. Training is to be repeated if there is a change in operations that presents a hazard which an employee has not been trained, when there is reason to believe that there have been deviations from the procedure, there is inadequacies in the employee's knowledge or use of this procedure, or a new hazard has been created. Training must be formally documented with the employee name, trainer signature, details of the training, and when it occurred.

### Description Of Duties

#### Entrant:

- Know and understand the hazards involved with the confined space including mode of exposure, signs or symptoms, and consequences of exposure
- Use appropriate personal protective equipment (PPE)
- Maintain communication with attendant to enable the attendant to monitor the entrant's status and to alert the entrant to evacuate
- Alert the attendant when a prohibited condition exists, when warning signs or symptoms of exposure exist
- Exit the confined space immediately when: there is an order to evacuate, an entrant recognizes any signs or symptoms that are presumed hazardous, a prohibited condition exists, and/or an evacuation alarm is activated.
- Entrants or their representative must be given the opportunity to participate in the permit review and signing, and air monitoring equipment calibration.

#### Attendant/Watch Person:

- Remain outside permit space during entry operations, unless relieved by another trained and authorized person
- Perform non-entry rescues when specified
- Know and understand existing and potential hazards
- Maintain communication with workers entering the permit required confined space
- Order an evacuation of the confined space when a hazardous condition exists inside or outside the confined space or when the attendant cannot perform the required duties
- Summon rescue/other services during an emergency
- Direct unauthorized personnel to stay away from the confined space
- Inform authorized entrant and supervisor of entry by unauthorized personnel
- Perform no other duties that interfere with the attendant's primary duties.
- If multiple spaces are to be monitored by a single attendant, include in the permit program, the means and procedures, to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored without distraction from the attendant's responsibilities.

### Supervisor:

- Know and understand the hazards involved with the confined space
- Verify emergency plan and specified entry conditions such as permits, tests, procedures, equipment, and training is completed before allowing entry
- Terminate entry and cancel permit(s) when the operations are completed or if a new condition exists
- Verify rescue services are available and equipment working properly
- Take appropriate measures to remove unauthorized entrants
- Ensure the operations remain consistent with the permit and that acceptable entry conditions are maintained
- Ensure that the appropriate air monitoring is completed.

### **Identify Confined Spaces**

Boldt will ensure that a competent person has identified all of the confined spaces and permit spaces at a worksite through evaluation and necessary testing before any of its employees begin work. This can be done by a Boldt employee or communicating with another employer at a multi-contractor worksite who has already done this.

### Annual Review

This policy will be reviewed annually and when measures may not protect employees, such as after any incidents or near misses. Any deficiencies will be corrected before entering any additional PRCS.

This review will evaluate the policy's effectiveness of providing protection to all affected employees.

### Communicating Between Multiple Employers

As the host employer, all details (e.g. entry employer's entry program, known hazards, new hazards, and hazard elimination/isolation procedures) about confined spaces at the worksite will be communicated with the controlling contractor before and after entry. Where the company has contracted with the property owner to manage it and transmit all confined space details, it will be considered the host employer.

As the controlling contractor, all details (e.g. employer's entry program, known hazards, new hazards, and hazard elimination/isolation procedures) about confined spaces at the worksite will be communicated with the host employer and all entry employers (i.e. subcontractors) before and after entry, ensuring that information is transferred to the different entry employers before and during entry so they don't create additional hazards for other entry employers' workers. Details will be communicated with other non-entry employers so that their workers do not create hazards or go into the confined space. As the entry employer, all details (e.g. entry program, known hazards, new hazards, and hazard elimination/isolation procedures) about confined spaces at the worksite will be communicated with the controlling contractor before and after entry.

As a non-entry employer, essential details about confined spaces will be communicated with the controlling contractor to determine where the confined spaces are and the necessary steps to prevent employees from accessing them or creating hazards for other workers. Employees will be instructed to not enter the identified confined spaces.

## Procedure

Listed below are the steps to be taken prior to entering a permit-required confined space.

- The supervisor must evaluate the workplace to determine if any spaces are permit-required confined spaces, provided that owner requirements are met. If the workplace contains permit spaces, the supervisor must inform exposed employees of the existence, location of, and the hazard posed by the permit spaces by posting danger signs (Exhibit A) or by other equally effective means.
- All persons involved in the confined space entry must obtain a Confined Space Entry Permit (Exhibit B) and receive instructions from their supervisor. The permit is to be completed in its entirety before any work in a confined space begins. A new permit must be issued at the beginning of each shift. All entrants, attendants, and entry supervisors are to be identified on the Confined Space Entry Permit. The permit, or copy of it, must be posted at the confined space entrance in order to warn others that an employee is working in the confined space. After each shift or when the work is completed, the permit must be filed in the jobsite office and kept for one year after entry has been made. Contact the Boldt Safety Department to reclassify your permit space to a non-permit space.
- The supervisor and/or on-site safety personnel will determine whether the air is safe to breathe and work in prior to entering. An evaluation of the following conditions must be made using a properly calibrated monitoring device before entering and while the confined space is occupied. Before entry into the confined space can be made, the following atmospheric conditions must be met:
  - a. Oxygen level ranges between 19.5% - 23.5%
  - b. Combustible gas less than 10% LEL
  - c. Hydrogen sulfide less than 10 ppm
  - d. Sulfur dioxide less than 2 ppm
  - e. Chlorine gas less than 0.5 ppm
  - f. Carbon monoxide less than 35 ppm
  - g. Contact owner for other hazards that may exist.
- Obtain any available information regarding confined space hazards and entry operations from the owner prior to entry. Know the hazards that may be faced during entry, including information on the method of entry, signs or symptoms (headache, nausea, profuse sweating, dizziness, etc.), and how to properly summon assistance, if necessary, for rescue purposes.
- Prior to working in the confined space, flange off all incoming and outgoing pipes and lockout all valves and electrical equipment in accordance with the lockout/tag out procedure.
- All ports available must be opened to provide adequate circulation. A confined space that has an unsafe atmosphere must be ventilated prior to entry and the atmosphere tested before and during entry. Continuous monitoring is required where engulfment hazards exist. If this cannot be completed, and entry is absolutely necessary, then the supplied-air breathing apparatus or the SCBA (self-contained breathing apparatus) or equivalent must be utilized.
- Prior to entry, the atmosphere within the confined space must be monitored for oxygen, hydrogen sulfide, and combustible gas and any other gases which may be encountered while in the confined space. Monitoring will be performed initially, intermittently (i.e.: breaks, lunch periods, etc.), or continuously as required. This information is to be reviewed with all members involved with the confined space.
- In the event the audible alarm or alarm and flashing lights on the monitoring device are activated; the person in the confined space must exit the space immediately. The exception to this rule is if the person is wearing a positive pressure respirator, such as SCBA or supplied- air. An employee may request additional monitoring at any time if there is reason to believe any changes have occurred.
- Lifelines (attached to the 'D' ring located in the center of the back) and safety harnesses must

be worn by anyone entering the permit required confined space, with the retrieval end located outside the confined space entrance. A mechanical device must be available to retrieve personnel from a vertical type permit space more than five feet deep. A watch person must be assigned to the confined space(s) and remain outside at all times in a position to handle the safety line and to summon assistance in case of an emergency. At no time can a person enter the confined space for rescue purposes without an approved respirator, lifeline, safety harness, and someone located outside the confined space. Note: Horizontal entry into a paper machine dryer can require special consideration for rescue and retrieve purposes. Contact the Boldt Safety Department for further information.

- There will be an attendant on duty outside the confined space during all permit entries. The attendant/watch person must continuously maintain an accurate account of authorized entrants in the permit space and communicate with the entrants as necessary.
- The type of communication (e.g. radio, voice, visual) between the attendant and entrants will be decided on before entry and included in the permit. Communication enables the attendant to monitor the entrants' status which will enable the attendant to alert entrants of the need to evacuate the space.
- All unauthorized persons approaching a confined space or attempting to enter a confined space must be warned to exit immediately.
- Smoking is prohibited inside and within twenty (20) feet of any confined space.
- All persons assigned to enter a confined space must review with their supervisors all potential light sources to determine if the equipment is adequate and safe to use within the confined space.
- A person trained in First Aid/CPR/AED must be available while the operation is taking place. The person is not to be part of the operation(s) taking place inside the permit-required confined space. In the event of an emergency, Boldt's Emergency Action Plan is to be utilized.
- No hot work (i.e.: welding, cutting and grinding, etc.) is permitted when the confined space contains combustible gases, vapors, and/or fumes.
- Hot work may be permitted in the confined space if combustible materials are adequately protected to eliminate any potential fire or explosion hazards. At least one fire extinguisher must be available in the immediate area of a confined space while hot work is being performed.
- The entry of any confined space is to be reviewed when it is believed that measures taken on the Confined Space Entry Program may not adequately protect employees. These circumstances may include but are not limited to:
  - a. Unauthorized entry of a permit space
  - b. Detection of a permit space hazard not covered by the permit
  - c. Detection of a new condition by the permit
  - d. Occurrence of an incident
  - e. A change in the use or configuration of a permit space
  - f. Employee complaints about the effectiveness of the program.
- To protect employee(s) working in the confined space, barricades will be strategically located around the perimeter to protect entrants from external hazards such as vehicles and pedestrians.
- Employees will be provided the required PPE to perform the task safely at the employer's expense.
- Expired/Canceled entry permits are to be maintained a minimum of one year to facilitate the review and correction of any problems encountered. Documentation is to be made of any changes made during the review.

### Confined Space Entry Permits

Each entry employer will ensure conditions are safe for entry in permit spaces through establishing, suspending and cancelling entry permits. If there are multiple entry employers in a confined space during the same entry, then one permit will be completed by coordinating with the controlling contractor and all entry employers.

Through completing an entry permit all measures needed to make the PRCS safe for entry will be documented. The entry supervisor on the permit will sign the entry permit authorizing that these necessary measures have been taken.

The permit's duration will be the amount of time needed to complete the task as identified on the permit. The entry supervisor will terminate the permit when the task identified is completed, suspended, or will cancel the permit when necessary.

A permit will be suspended when a temporary condition not allowed in the permit occurs in or near the PRCS and doesn't change its configuration or creates any new hazard. The entry supervisor needs to reevaluate the PRCS before lifting any suspension or cancelling the permit.

A permit will be canceled when a condition not allowed in the permit occurs in or near the PRCS and isn't temporary or, changes its configuration or creates any new hazard.

Every entry permit will be kept for at least one year and addressed in the annual review.

### **Rescue And Emergency Services**

- It will be determined at each jobsite location whether Boldt will be providing a rescue team or arrangements will be made with the client and/or an outside rescue team (i.e. Fire Department). Boldt will contact the outside rescue team before entry and communicate the potential hazards to ensure they are equipped and trained to conduct a rescue, and give them opportunity to examine the entry site and practice a rescue.
- The determining factor on who will provide the rescue team will be based on the following:
  - a. Ability to respond to a rescue summons in a timely manner
  - b. Evaluating the rescue service's ability in terms of proficiency with rescue equipment and related tasks
- The following criteria is to be met for an employee designated rescue team:
  - a. Provide PPE required to conduct permit space rescue at no cost to the employee and the training to use it proficiently
  - b. Train employees to perform assigned rescue duties. Each individual is to be trained so that they are proficient as an authorized entrant.

A rescue team will be on-site for any entry into permit spaces that are immediately dangerous to life and health.

## DEFINITIONS

CONFINED SPACE: A space that:

- is large enough and is so configured that an employee can bodily enter and perform assigned work
- has limited or restricted means for entry or exit (i.e., tanks, vessels, silos, boilers, storage bins, ventilation or exhaust ducts, hoppers, underground utility vaults, and pits are spaces that may have limited means of entry)
- Is not designed for continuous employee occupancy.

ENGULFMENT: The surrounding and effective capture of a person by a liquid or finely divided (flow able) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

ENTRY: The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

HAZARDOUS ATMOSPHERE: An atmosphere that may expose employees to the risk of death, incapacitation, or impairment preventing the ability for self-rescue (i.e., escape unaided from a permit space).

NON-PERMIT CONFINED SPACE: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

PERMIT-REQUIRED CONFINED SPACE: A confined space that has one or more of the following characteristics:

- contains or has a potential to contain a hazardous atmosphere
- contains a material that has the potential for engulfing an entrant
- has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
- contains any other recognized serious safety or health hazard

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: Any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible adverse health effects.

Exhibit A – Confined Space Danger



**CONFINED SPACE**

**ENTER BY  
PERMIT ONLY**



# Confined Space Entry Permit

Date: \_\_\_\_\_

Project No. \_\_\_\_\_ Name of Project: \_\_\_\_\_

Location and Description of Confined Space: \_\_\_\_\_

Purpose of Entry: \_\_\_\_\_

Emergency Phone #: \_\_\_\_\_ Shift: \_\_\_\_\_ Expiration: \_\_\_\_\_ AM/PM

Type of Monitor: \_\_\_\_\_ Serial No. \_\_\_\_\_ Calibration Date: \_\_\_\_\_

### CONFINED SPACE PREPARATION (SPECIAL REQUIREMENTS)

	Yes	N/A	Supervisor's Initials
1. Pre-Entry Meeting held (including supervisor in area of work) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Lockout/Tagout (follow lockout/tagout procedure) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Block off all pipes, hoses, ducts, etc. ....	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Area ventilated continuously .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
5. Purged (drained, washed, properly cleaned) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Secured area (signs, barricades, guardrails, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
7. Hot Work Permit (welding, grinding, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
8. Physical hazards present (heat, obstructions, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
9. Personnel needed (rescue/other owner requirements) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
10. Did each employee receive training in confined space entry? (See names below) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____

### APPROPRIATE SAFETY EQUIPMENT AVAILABLE FOR USE

	Yes	N/A	Supervisor's Initials
1. Personal Protective Equipment (hard hats, eye and hand protection, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
2. Respirators (Air Purifying, SCBA, Hip Air, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
3. Rescue Equipment/Procedure (harness, lifeline, tripod, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
4. Lighting – ground fault circuit interrupters .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
5. Fire Protection (extinguishers at entrance, water hose, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
6. Communication (voice, visual, radio – circle one) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____
7. Access and egress (ladders, scaffold, etc.) .....	<input type="checkbox"/>	<input type="checkbox"/>	_____

### ATMOSPHERIC TESTS

Monitor various areas and levels

	Results	Time	Initials	Results	Time	Initials	Results	Time	Initials	Results	Time	Initials
% of Oxygen O <sub>2</sub> (19.5%-23.5%)*												
% Flammability (LEL<10)												
Hydrogen Sulfide H <sub>2</sub> S (TLV<10ppm)												
Carbon Monoxide CO (TLV<35 ppm)												
Other _____												

Retests needed and frequency (periodic-after breaks/continuous): \_\_\_\_\_

Entrant	In/Out	In/Out	In/Out	In/Out	In/Out	In/Out	In/Out

Attendants: 1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

\*NOTE: Non-combustible gas (Argon, Nitrogen, Helium, etc.) causes Oxygen deficiency. Continuous monitoring required during the use of these products.

All necessary conditions and/or preparations have been satisfied and I certify that the safety guidelines for Confined Space Entry have been followed. When work is completed, the permit shall be filed in the jobsite office and kept for **ONE YEAR (1)** after entry has been made.

SIGNED: \_\_\_\_\_ Evaluation has deemed this space as non permit required.   
(Entry supervisor in charge of job)

### ALL INFORMATION ON THIS FORM SHALL BE COMPLETED PRIOR TO ENTRY OF THE CONFINED SPACE.

COPY DISTRIBUTION: White—Post Next to Confined Space; Pink—Jobsite File

FORM NO. S-23 (REV. 11-04)



## Construction Infection Control Program

### Purpose

It is the purpose of The Boldt Company to establish an infection control plan that prevents potential harm to patients, staff, construction workers, and others entering the area. This will be accomplished by establishing a proactive environment throughout the organization that ensures the continual process of risk evaluation, education, and training of all parties associated with the healthcare project.

The risk of nosocomial fungal infections (infection that develops after a patient is admitted to a hospital or other institution) during periods of hospital renovation or construction has been a highly recognized concern. This Infection Control Program is designed to prevent the spread of fungal spores and bacteria (such as *Aspergillums* and *Legionella*) which may cause disease in susceptible individuals during hospital demolition/renovation or construction projects. Construction and demolition/renovation may generate great numbers of suspended fungal spores which can be carried by air currents to remote locations. Inattentiveness to proper measures during hospital demolition/renovation can cause excessive levels of spore dispersion. The small size of the *aspergillums* and *legionella* enables it to reach the lower respiratory tract of a human host.

- The degree of risk is determined by several factors:
  1. The density of the spores in the air being breathed
  2. The degree of immunosuppression
  3. The length of time a patient breathes contaminated air.
- Patients most at risk include:
  1. Patients with congenital or acquired immunodeficiency syndromes.
  2. Premature neonates.
  3. Patients receiving immunosuppressive therapy (i.e. oncology or transplants)
- Others at risk include:
  1. All other patients
  2. Hospital employees
  3. Construction workers
  4. All other people in the affected areas

### Responsibility

The overall responsibility for controlling and preventing the spread of disease rests with all people involved in project development and execution. One person needs to serve as a single point of contact to ensure that infection control procedures are incorporated in each project from inception through completion. This person will work closely with management and supervision at each stage of execution.

## Procedures

Work areas are divided into FOUR RISK GROUPS and construction activities are divided into FOUR TYPES for the sake of work classification. This determines the CLASS OF CONTROL PRECAUTIONS necessary for construction activities. There is an Infection Control Construction Permit (Exhibit A), or use an equivalent owner's form, available to assist in determining the proper protocol and providing the necessary documentation.

- Risk group examples:

<b>Low Risk (Group 1)</b>	<b>Medium Risk (Group 2)</b>	<b>High Risk (Group 3)</b>	<b>Highest Risk (Group 4)</b>
General Office Areas	Cardiology Echocardiography Endoscopy Nuclear Medicine Physical Therapy Radiology Therapy Radiology/MRI Respiratory Therapy	CCU Emergency Room Labor & Delivery Laboratories (Specimen) Newborn Nursery Outpatient Surgery Pediatrics Pharmacy Post Anesthesia Care Unit Surgical Units	Areas w/Immunocompromised Patients Burn Unit Cardiac Cath Lab Central Sterile Supply Intensive Care Units Medical Unit Negative Pressure Isolation Rooms Oncology Operating Rooms including C-section room

- Identify the type of construction project activity.

**TYPE A** - Inspection and Non-Invasive Activities. Includes, but is not limited to:

- Removal of ceiling tiles for visual inspection limited to one tile per fifty square feet.
- Painting, but not sanding.
- Wall covering, electrical trim work, minor plumbing, and activities which don't generate dust or require cutting of walls or access to ceilings other than for visual inspection.

**TYPE B** - Small scale, short duration activities which create minimal dust. Includes, but not limited to:

- Installation of telephone and computer cabling.
- Access to chase spaces

Cutting of walls or ceiling where dust migration can be controlled.

**TYPE C** - Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies. Includes, but is not limited to:

- Sanding of walls for painting or wall covering

- b. Removal of floor coverings, ceiling tiles and casework
- c. New wall construction
- d. Minor duct work or electrical work above ceilings
- e. Major cabling activities
- f. Any activity, which cannot be completed within a single work shift.

**TYPE D** - Major demolition and construction projects. Includes, but is not limited to:

- a. Activities which require consecutive work shifts
- b. Requires heavy demolition or removal of a complete cabling system
- c. New construction.

Construction category classifications are as follows:

CLASS Standard Procedures:

- 1. Execute work by methods to minimize raising dust from construction operations.
- 2. Immediately replace a ceiling tile displaced for visual inspection.

Site Clean Up Procedures: Clean work area upon completing task. CLASS II.

**Standard Procedures:**

- 1. Provide active means to prevent airborne dust from dispersing into atmosphere.
- 2. Water mist work surfaces to control dust while cutting.
- 3. Seal unused doors with duct tape
- 4. Block off and seal air vents
- 5. Place dust mat at entrance and exit of work area
- 6. Remove or isolate HVAC system in areas where work is being performed.

**Site Clean Up Procedures:**

- 1. Wipe work surfaces with disinfectant.
- 2. Contain construction waste before transport in tightly covered containers.
- 3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving the area.
- 4. Remove isolation of HVAC system in areas where work is being performed.

CLASS III. Standard Procedures:

- 1. Remove or isolate HVAC system in area where work is being done to prevent contamination of duct system.
- 2. Complete all critical barriers (i.e. sheetrock, plywood, plastic, etc.) to seal area from non-work area or implement control cube method (cart with covering and sealed connection to work site with HEPA system for vacuuming prior to exit) before construction begins.
- 3. Maintain negative air pressure within work site utilizing HEPA-equipped air filtration units.
- 4. Contain construction waste before transport in tightly covered containers
- 5. Cover transport receptacles or carts.

***Tape covering unless solid lid Site Clean Up Procedures:***

1. Do not remove barriers from work area until completed project is inspected by the owner's representative and/or Safety Department and Infection Control Department and then thoroughly cleaned/sanitized by the owner's Environmental Services personnel.
2. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction
3. Vacuum work area with HEPA filtered vacuums
4. Wet mop area with disinfectant.
5. Remove isolation of HVAC system in areas where work is being performed.

**CLASS IV. Standard Procedures:**

1. Isolate HVAC system in area where work is being done to prevent contamination of duct system.
2. Complete all critical barriers (i.e. sheetrock, plywood, plastic, etc.) to seal area from non-work area or implement control cube method (cart with covering and sealed connection to work site with HEPA system for vacuuming prior to exit) before construction begins.
3. Maintain negative air pressure within work site utilizing HEPA-equipped air filtration units.
4. Seal holes, pipes, conduits, and punctures appropriately.
5. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum prior to leaving work site or they can wear cloth or paper coveralls (disposable) that are removed each time they leave the work site.
6. All personnel entering the work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.
7. Do not remove barriers from work area until completed and the project is inspected by the owner's representative and/or Safety Department and Infection Control Department and then thoroughly cleaned/sanitized by the owner's Environmental Services personnel.

**Site Clean Up Procedures:**

1. Remove barrier material carefully to minimize spreading of dirt and debris associated with construction.
2. Contain construction waste before transport in tightly covered containers.
3. Cover transport receptacles or carts Tape covering unless solid lid.
4. Vacuum work area with HEPA filtered vacuum
5. Wet mop area with disinfectant
6. Remove isolation of HVAC system in areas where work is being performed.

**Matrix**

This may be used for assistance in determining the proper precautions to be taken during construction activities. Once the classification is known, the Infection Control Inspection Checklist (Exhibit B), or an equivalent owner's form, may be utilized to assist in the documentation process.

Patient Risk Group	TYPE A	TYPE B	TYPE C	TYPE D
LOW Risk Group	I	II	II	III/IV
MEDIUM Risk Group	I	II	III	IV
HIGH Risk Group	I	II	III/IV	IV
Highest Risk Group	II	III/IV	III/IV	IV

## **DEFINITIONS**

ANTEROOM: An outer room that leads to another room and that is often used as a waiting room.

ASPERGILLUS: A genus of fungi that contains many species, a number of them with black, brown, or green spores.

ECHOCARDIOGRAHY: The use of ultrasound in the investigation of the heart and great vessels and diagnosis of cardiovascular lesions.

ENDOSCOPY: Examination of the interior of a canal or hollow viscous by means of a special instrument, such as an endoscope.

IMMUNOCOMPROMISED: Denoting an individual whose immunologic mechanism is deficient either because of an immunodeficiency disorder or because it has been rendered so by immunosuppressive agents.

IMMUNODEFICIENCY: A condition resulting from a defective immune mechanism.

IMMUNOLOGIC: The science concerned with various phenomena of immunity, induced sensitivity, and allergy.

IMMUNOSUPPRESSION: Prevention or interference with the development of immunologic response.

LEGIONELLA: A genus of aerobic, motile, non-acid-fast, non-encapsulated, gram-negative bacilli that have a no fermentative metabolism and require iron salts for growth. They are water-dwelling and airborne spread; and pathogenic for humans.

NEONATES: Relating to the period immediately succeeding birth and continuing through the first 28 days of life.

NOSOCOMIAL INFECTION: Denoting a new disorder (not the patient's original condition) associated with being treated in a hospital, such as a hospital-acquired infection.

PATHOGENIC: Causing disease or abnormality.

# Exhibit A – Infection Control Construction Permit



## Infection Control Construction Permit

*This checklist is not intended to be a substitute for project specifications and procedures. Being familiar in Boldt's Quality Work Procedure QWP 9.50.3.3 will assist in accomplishing the best practices that result in quality construction.*

Job #/Job Description:			Permit No:		
Location of Construction:			Project Start Date:		
Project Coordinator:			Estimated Duration:		
Contractor Performing Work:			Permit Expiration Date:		
Supervisor:			Telephone:		
YES	NO	CONSTRUCTION ACTIVITY	YES	NO	INFECTION CONTROL RISK GROUP
		TYPE A: Inspection, non-invasive activity			GROUP 1: Low Risk
		TYPE B: Small scale, short duration, moderate to high levels			GROUP 2: Medium Risk
		TYPE C: Activity generates moderate to high levels of dust, requires greater than one work shift for completion (multiple days).			GROUP 3: Medium/High Risk
		TYPE D: Major duration and construction activities Requiring consecutive work shifts			GROUP 4: Highest Risk
<b>CLASS I</b>		1. Execute work by methods to minimize raising dust from construction operations.	2. Immediately replace any ceiling tile displaced for visual inspection. 3. Minor Demolition for Remodeling		
<b>CLASS II</b>		1. Provides active means to prevent air-borne dust from dispersing into atmosphere 2. Water mist work surfaces to control dust while cutting. 3. Seal unused doors with duct tape. 4. Block off and seal air vents. 5. Wipe surfaces with disinfectant.	6. Contain construction waste before transport in tightly covered containers. 7. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area. 8. Place dust mat at entrance and exit of work area. 9. Remove or isolate HVAC system in areas where work is being performed.		
<b>CLASS III</b>		1. Obtain infection control permit before construction begins. 2. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 3. Complete all critical barriers or implement control cube method before construction begins. 4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units. 5. Do not remove barriers from work area until complete project is thoroughly cleaned by Environmental Services Dept.	6. Vacuum work with HEPA filtered vacuums. 7. Wet mop with disinfectant 8. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction. 9. Contain construction waste before transport in tightly covered containers. 10. Cover transport receptacles or carts. Tape covering. 11. Remove or isolate HVAC system in areas where work is being performed.		
Initial & Date					
<b>Class IV</b>		1. Obtain infection control permit before construction begins. 2. Isolate HVAC system in area where work is being done to prevent contamination of duct system. 3. Complete all critical barriers or implement control cube method before construction begins. 4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units. 5. Seal holes, pipes, conduits, and punctures appropriately. 6. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site.	7. All personnel entering work site are required to wear shoe covers 8. Do not remove barriers from work area until completed project is thoroughly cleaned by the Environmental Service Dept. 9. Vacuum work area with HEPA filtered vacuums. 10. Wet mop with disinfectant. 11. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction. 12. Contain construction waste before transport in tightly covered containers. 13. Cover transport receptacles or carts. Tape covering. 14. Remove or isolate HVAC system in areas where is being done.		
Initial & Date					
Additional Requirements:					
____Date, ____Initials		____Date, ____Initials		Exceptions/Additions to this permit are noted by attached memoranda	
Permit Request By:			Date:	Permit Authorized By:	
Date:			Date:	Date:	

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# Exhibit B – Infection Control Inspection Checklist



## Infection Control Inspection Checklist

*This checklist is not intended to be a substitute for project specifications and procedures. Being familiar in Boldt's Quality Work Procedure QWP 9.50.3.3 will assist in accomplishing the best practices that result in quality construction.*

<b>Facility Project #/Title:</b>	<b>Inspection Period:</b>
<b>Project Description:</b>	<b>Type Category:</b>
<b>Location (Bldg./Floor):</b>	<b>Prepared by/Date:</b>

<b>Class Item to check</b>	<b>Sun</b>	<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thurs</b>	<b>Fri</b>	<b>Sat</b>	<b>Remarks</b>
<b>Dates:</b>								
<b>Class #1</b>								
Work methods minimize dust.								
Displaced ceiling tile immediately replaced.								
<b>Class #2</b>								
All Class #1 items complete.								
Air-borne dust not dispersed into atmosphere.								
Dust controlled while cutting.								
Unused doors sealed.								
Air vents blocked & sealed.								
Surfaces wiped with disinfectant.								
Construction waste contained before transport.								
Transport containers tightly covered.								
Items wet mopped or HEPA vacuumed before leaving work area.								
Dust or wet mats at work area access.								
HVAC system removed or isolated.								
<b>Class #3</b>								
All Class #2 items complete.								
Infection control permit completed.								
Negative air pressure maintained with HEPA units.								
Barriers left until Environmental Services cleaned.								
Wet mopping using disinfectant.								
Barrier removal minimizes spread of construction dirt and debris.								
<b>Class #4</b>								
All Class #3 items complete.								
Holes, pipes, conduits, and punctures sealed.								
Anteroom in use by all personnel.								
HEPA vacuum used in anteroom.								
Coveralls removed when leaving work site.								
Shoe covers used by all personnel in work site.								

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## Environmental Policy

### Purpose

The Boldt Company recognizes and believes that our actions have an effect on the environment and of future generations. It is for this reason that we are committed to protecting the environment, our employees, and the public during all of our work activities. Our objective goes beyond mere compliance with environmental regulations. Specifically, the company will:

- Conduct its operations with environmental laws and regulations designed to protect employees, the public, and the environment
- Meet or exceed environmental regulations and employ best practices in our work activities
- Control the release of environmental pollutants which may cause adverse effects on the air, land, water, and population of this planet
- Include environmental considerations in business decisions made at the highest level of our organization.

By meeting these objectives, we will be doing our part to protect the environment while providing our services in a professional, responsible manner.

### Objectives

It is therefore the policy of the Company to:

- Aim to lessen environmental damage and increase where possible the opportunities for environmental enhancement.
- Consider the environmental impact as a vital part of the decision making process.
- Comply with legal requirements and establish goals to achieve an ongoing reduction in environmental conflict in all parts of our operation.
- Encourage personal effort on the part of all employees and sub-contractors to avoid and prevent environmental damage and to act as good neighbors to those affected by building and construction activities.
- Provide and exhibit this policy and such written instructions as are necessary to aid the implementation of this policy.

### Responsibility

The Project Manager/Superintendent on site or at a place of work will be responsible for the implementation of the Environmental Policy ensuring that:

- All work is carried out in accordance with all relevant Acts and Regulations set forth by Federal, State, local municipalities, and Company Policy.
- Waste is removed in accordance with legislation by registered carriers.
- Measures are taken to control ground, river, and coastal water pollution.
- Measures are taken to control excessive noise pollution.
- A good neighbor policy is implemented.
- Any deficiencies observed are corrected and/or consulted with the Safety Department. The Safety Department will provide guidance, information, and training as necessary.



It is the responsibility of everyone within the organization to implement this policy to the best of their ability. To further enhance the program, Boldt endorses the following actions at its offices and jobsites:

- Minimizing material waste.
- Promoting recycling options.
- Conserving water, energy, and paper.
- Preserving wildlife habitats, flora, archaeological and heritage sites as appropriate.
- All incidents detrimental to the environment are properly investigated, reported as necessary and preventative action taken against repetition.



## Safety Program

### E. Special Programs

Reviewed: January 4, 2019

Effective: May 16, 2001

## Hazard Communication Program

### Purpose

The purpose of the Hazard Communication Program is to ensure that the hazards of chemicals located on Boldt projects and facilities are evaluated and that information concerning physical and health hazards is transmitted to potentially exposed employees. It is the Boldt Company intent to fully comply with the OSHA Standard 1910.1200 and 1926.59, as well as to improve the overall safety of our company. The requirements of this policy are intended to be consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), Revision 3. A successful Hazard Communication Program will reduce potential incidents of chemical source illnesses and injuries. The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, safety data sheets and employee training.

The Globally Harmonized System (GHS) of Classification and Labeling of Chemicals is a worldwide initiative to promote standard criteria for classifying chemicals according to their health, physical and environmental hazards. It uses pictograms, hazard statements, and the signal words “Danger” and “Warning” to communicate hazard information on product labels and safety data sheets in a logical and comprehensive way. The primary goal of GHS is better protection of human health and the environment by providing chemical users and handlers with enhanced and consistent information on chemical hazards.

The Globally Harmonized System (GHS) is not in itself a regulation or a model regulation. It is a framework from which competent authorities may select the appropriate harmonized classification & communication elements. Competent authorities will decide how to apply the various elements of the GHS within their systems based on their needs and the target audience.

The GHS includes the following elements:

- a) Harmonized criteria for classifying substances and mixtures according to their health, environmental and physical hazards
- b) Harmonized hazard communication elements, including requirements for labeling and safety data sheets.

The harmonized elements of the GHS may be seen as a collection of building blocks from which to form a regulatory approach.

### General Information

This written Hazard Communication Program is an integral part of the Boldt Companies continuing Employee Safety Awareness Program. The Occupational Safety & Health Administration (OSHA) Hazard Communication Standard (1926.59 & 1910.1200), from which this program has been developed, requires that information be provided to our employees concerning various hazardous chemicals used in the workplace to which employees may be exposed. The standard applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency. Chemicals are defined as any

element, chemical compound, or mixture of elements and/or compounds. This could be in liquid, solid, or gas form. Manufacturers and importers are required to evaluate all chemicals and contractors, as end-users need only to concern themselves with those chemicals determined by the manufacturers or importers to be hazardous.

The standard exempts some chemicals from certain requirements. Exempt from labeling are pesticides (if covered by federal regulation); food, food or color additives, drugs, cosmetic, or medical/veterinary devices, including materials intended for use in such products; distilled spirits, wine, or malt beverages intended for non-industrial use; and consumer products. Exempt from the entire section pertaining to construction are: hazardous waste when subject to EPA regulations; tobacco or tobacco products; wood or wood products (this does not exempt sawdust or wood products treated with chemicals); food, drugs, or cosmetics intended for use by the employee while in the workplace; articles and consumer products used in the same manner as normal use where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended.

The definition of articles is manufactured item(s) formed to a specific shape or design, which at end-use functions dependent in whole or in part upon its shape or design; and which does not release, or otherwise result in exposure to a hazardous chemical under normal condition of use. If structurally disturbed/damaged (cutting, grinding, welding, modifying) and the article has hazardous chemicals in its make, the exemption does not apply. This would apply to wood, concrete block, drywall, tile, steel, pipe, etc. It is therefore suggested that Safety Data Sheets (SDS/) for all materials on the jobsite be obtained and recorded.

The program addresses container labeling, SDS/, employee training, and other information on chemicals found in the workplace. The goal of this program is to reduce the possibility of incidents caused by exposure to chemicals as well as informing employees as to the type of products/chemicals used on the job-site. We intend to do that by providing employees with as much information as needed concerning the hazards of chemicals utilized, and to present that information in a usable, readily

### **Components Of Our Hazard Communication Program Chemical Inventory List**

The OSHA standard covers:

1. An inventory list of chemicals found on the workplace.
2. Labeling of hazardous materials in the workplace.
3. Obtaining and making available Safety Data Sheets (SDSs).
4. Training employees who work with chemicals on the different aspects of the program.  
Ensuring employees are made aware of any hazards they may face while working in the workplace.
5. Identifying the specific hazards associated with materials used in the workplace
6. Relaying the hazards and precautions associated with non-routine tasks

These six main components of this program are described in greater detail below.

## Roles And Responsibilities

Compliance with and management of the Boldt Company Hazard Communication Program is the responsibility of:

- Construction Project Managers and Project Superintendents for site management;
- Local safety managers/representatives to provide assistance and
- Area management to assure compliance.

Specific tasks may be assigned to an employee (the designee), however management maintains overall responsibility for compliance.

**Management** is responsible to ensure compliance with the 6 main elements of HAZCOM as noted above.

**Project Managers and Superintendents** are responsible to oversee the HAZCOM program and provide day to day guidance to employees to assure a safe and healthful workplace for all employees. Project manager and superintendents will utilize the safety representatives as a resource to train employees and effectively maintain the elements of the HAZCOM program.

**Employees** must review this written hazard communication plan and:

- Follow all safety instructions provided by this plan and by your supervisor
- Complete Hazard Communication training
- Obtain an SDS for any new chemical to be purchased
- Forward new SDSs to the site's safety representative to facilitate updating.
- Label containers that are used for the transfer of chemicals (secondary or portable containers)
- Read Safe Use Guide information and chemical labels prior to working with a chemical
- Always wear personnel protective equipment specific to each chemical Under OSHA, the Hazard Communication Program also establishes rights for employees:
- You have the right to personally receive information regarding hazardous substances to which you may be exposed.
- You have the right for your physician or collective bargaining agent to receive information regarding hazardous substances to which you may be exposed.
- You may exercise your rights under the provisions of the Occupational Safety and Health Act (OSHA) without concern for any discharge or discrimination.
- This written Hazard Communication Program is available for you to read at any time mutually acceptable between employer and employee.
- You have the right to refuse to work with a toxic substance if you have not been provided with SDS information within the prescribed time limits.
- You may petition OSHA to have any chemical or substance added, removed or modified on the OSHA toxic substance list.
- You may request a copy of an SDS for a material to which you may be exposed. The request must be honored within ten days.

**Site Safety Representative** reviews and updates the HAZCOM program:

- As new chemicals arrive, the representative sends new SDSs (via email) to the Boldt Corporate Safety Office in Appleton, WI. The Corporate Safety then adds the SDS information to the database. The site safety representative then prints out the new SDS chemical inventory list and puts it in the Haz com Manual, along with the new SDSs.
- Update the SDS chemical inventory list at least annually, working with department heads.
- Contact chemical manufacturers or vendors if an SDS has not been supplied with an initial

shipment.

- Coordinate with supervisors to ensure all hazardous chemicals are properly labeled.
- Coordinate the employee HAZCOM training sessions.

**Contractors/sub-contractors** and their employees must review this plan and provide the following information to the site safety coordinator:

- A list of hazardous chemicals they will use while at this workplace
- An SDS for each hazardous chemical being used by contractor
- Follow all safety rules at this workplace
- Always wear personnel protective equipment for each hazardous chemical

**Corporate Safety Director** reviews new SDSs provided by the sites for hazards, and updates the Hazard Communication Program/GHS system by archiving old SDS's or changing/adding new SDS's to the system.

## **1. CHEMICAL INVENTORY:**

A chemical inventory list is a required element of the Hazard Communication Program. The chemical inventory list must contain all the known hazardous chemicals used or stored at the workplace. A list of known hazardous chemicals used or stored at the workplace is available by the following sources: on the company Intranet (Info Center), by designated laptop computer, CD Rom, or hard copy established for each project work environment. For any new product not already inventoried, a SDS must be obtained. A copy of the SDS is to be sent to the Safety Department at Boldt's Corporate Office and a copy filed within the job file. The new product will then be added to the chemical inventory list and maintained at the jobsite where utilized. Be sure to consider all materials at the workplace. A Boldt Corporate form is available to use to compile the chemical inventory. (See Exhibit A at end of HAZCOM policy). This form should be given to all contractors and sub-contractors as they arrive on Boldt project locations to collect this important data.

A current list of all hazardous chemicals found in any form such as solid, liquid, vapor, gas or mist that is specific to your site must be included in your HAZCOM file or booklet. Once this list has been compiled, each chemical or product is evaluated to determine the physical and health hazards, and the target organs affected by these hazards. In addition to the primary hazards, all of the other known hazards specific to each chemical have been included in the list. Each chemical at the facility will be evaluated to determine the degree of danger or the hazard level associated with it.

## **2. CONTAINER LABELING:**

- The Federal Standard requires that chemical manufacturers, importers, and distributors properly label all shipments of hazardous chemicals with the identity of the chemical, clearly noted hazard warnings, and the name and address of the manufacturer or other responsible party.
- Upon receiving shipments from the manufacturer or distributor, the shop/warehouse facility and/or job-site will verify that the chemical containers are properly labeled. All containers covered by the Standard will be labeled, tagged, or marked with the identity of the hazardous chemical contained therein, and will show hazard warnings appropriate for employee protection.
- Hazard warnings may be depicted by symbols (pictograms), signal words (Danger or Warning) and hazard statement (hazard class or category that describes the nature of the hazard). The hazard warning will be legible, in English, and prominently displayed. If non-English speaking employees are present, information will be provided in their language.
- If employees discover any unlabeled containers or improperly labeled containers in their work

area, they're instructed to immediately notify their supervisor and have the container labeled prior to use.

- Portable containers holding a potentially hazardous chemical (e.g., a bucket of solvent) drawn by an employee from a labeled container and intended for use of that employee only during the course of his or her shift are not required to be labeled. However, it is a good practice to label every container.
- Containers into which chemicals will be transferred and which can be expected to be used by several workers and used over a period longer than one shift will be labeled to show contents, manufacturer, and an appropriate hazard warning. Labels which become torn, corroded, or defaced such that the content and hazard information cannot be determined will be replaced. For replacement purposes, preprinted hazardous materials labels are utilized that provide all required information. Boldt has a uniform label that can also be used for small portable containers as well as large bulk containers, such as 55 gallon drums. Ready-made labels are available through the Safety Department on the following items:
- If and when informed of new or significant hazards by the chemical supplier and/or distributor, labels for these portable containers will be changed accordingly.

### GHS Label Elements

- **Symbols** (GHS hazard pictograms): Convey health, physical and environmental hazard information, assigned to a GHS hazard class and category. Pictograms include the harmonized hazard symbols plus other graphic elements, such as borders, background patterns or colors that are intended to convey specific information.
- **Signal Words:** "Danger" or "Warning" will be used to emphasize hazards and indicate the relative level of severity of the hazard, assigned to a GHS hazard class and category. Some lower level hazard categories do not use signal words. Only one signal word corresponding to the class of the most severe hazard should be used on a label.
- **Hazard Statements:** Standard phrases assigned to a hazard class and category that describe the nature of the hazard. An appropriate statement for each GHS hazard should be included on the label for products possessing more than one hazard.







The additional label elements included in the GHS are:

- **Precautionary Statements:** Measures to minimize or prevent adverse effects. There are four types of precautionary statements covering: prevention, response in cases of accidental spillage or exposure, storage, and disposal. The precautionary statements have been linked to each GHS hazard statement and type of hazard.
- **Product Identifier** (ingredient disclosure): Name or number used for a hazardous product on a label or in the SDS. The GHS label for a substance should include the chemical identity of the substance. For mixtures, the label should include the chemical identities of all ingredients that contribute to acute toxicity, skin corrosion or serious eye damage, germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitization, or Target Organ Systemic Toxicity (TOST), when these hazards appear on the label.
- **Supplier identification:** The name, address and telephone number should be provided on the label.
- **Supplemental information:** Non-harmonized information on the container of a hazardous product that is not required or specified under the GHS. Supplemental information may be used to provide further detail that does not contradict or cast doubt on the validity of the standardized hazard information.

The GHS includes directions for application of the hazard communication elements on the label. In particular, it specifies for each hazard, and for each class within the hazard, what signal word,

pictogram, and hazard statement should be used. The GHS hazard pictograms signal words and hazard statements should be located together on the label. The actual label format or layout is not specified in the GHS.

**GHS Labeling Pictograms**  
**HCS Pictograms and Hazards**

<p><u>Health Hazard</u></p>  <ul style="list-style-type: none"> <li>▪ Carcinogen</li> <li>▪ Mutagenicity</li> <li>▪ Reproductive Toxicity</li> <li>▪ Respiratory Sensitizer</li> <li>▪ Target Organ Toxicity</li> <li>▪ Aspiration Toxicity</li> </ul>	<p><u>Flame</u></p>  <ul style="list-style-type: none"> <li>▪ Flammables</li> <li>▪ Pyrophorics</li> <li>▪ Self-Heating</li> <li>▪ Emits Flammable Gas</li> <li>▪ Self-Reactives</li> <li>▪ Organic Peroxides</li> </ul>	<p><u>Exclamation Mark</u></p>  <ul style="list-style-type: none"> <li>▪ Irritant (skin and eye)</li> <li>▪ Skin Sensitizer</li> <li>▪ Acute Toxicity</li> <li>▪ Narcotic Effects</li> <li>▪ Respiratory Tract Irritant</li> <li>▪ Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p><u>Gas Cylinder</u></p>  <ul style="list-style-type: none"> <li>▪ Gases Under Pressure</li> </ul>	<p><u>Corrosion</u></p>  <ul style="list-style-type: none"> <li>▪ Skin Corrosion/Burns</li> <li>▪ Eye Damage</li> <li>▪ Corrosive to Metals</li> </ul>	<p><u>Exploding Bomb</u></p>  <ul style="list-style-type: none"> <li>▪ Explosives</li> <li>▪ Self-Reactives</li> <li>▪ Organic Peroxides</li> </ul>
<p><u>Flame Over Circle</u></p>  <ul style="list-style-type: none"> <li>▪ Oxidizers</li> </ul>	<p><u>Environment</u> (Non-Mandatory)</p>  <ul style="list-style-type: none"> <li>▪ Aquatic Toxicity</li> </ul>	<p><u>Skull and Crossbones</u></p>  <ul style="list-style-type: none"> <li>▪ Acute Toxicity (fatal or toxic)</li> </ul>

**GHS Hazard Identification**

Elements of the GHS labeling system include: product identifier, signal word, hazard statement, hazard pictogram, precautionary statements and supplier information. These elements allow the employer to assess the risk of using the product.

The basic approach to risk assessment is characterized by the simple formula: Hazard × Exposure = Risk. Thus if you can minimize either hazard or exposure, you minimize the risk or likelihood of harm. Successful hazard communication alerts the user to the presence of a hazard and the need to minimize exposures and the resulting risks. The hazard can then be managed through the hierarchy of controls by seeking to eliminate the chemical, substituting to a less hazardous chemical, engineering out the hazard (such as use of ventilation), use of warning signs and labels, implementation of administrative controls and use of personal protective equipment.

### **3. SAFETY DATA SHEETS (SDS):**

A safety data sheet (SDS) is a written compilation of information about the hazards of that product. In industrial chemicals, there is a list of data elements that have to show up. Under the old OSHA standard there was no required format for that. Now, under GHS and now under OSHA, there's a prescribed format for the disclosure on the safety data sheets. There's a standard format and there's also specific information that has to be included in each section.

1. *Product and company identification*
2. *Hazards identification*
3. *Composition/ Information on Ingredients*
4. *First-aid measures*
5. *Fire-fighting measures*
6. *Accidental release measures*
7. *Handling and storage*
8. *Exposure controls/personal protection*
9. *Physical and chemical properties*
10. *Stability and reactivity-*
11. *Chemical stability.*
12. *Toxicological information*
13. *Ecological information*
14. *Disposal considerations*
15. *Transport information*
16. *Regulatory information*

- Chemical manufacturers and importers are required by the Standard to develop a SDS for each hazardous chemical they produce or import. The SDS contains information on the chemicals, such as physical properties, health/safety data, first aid information, etc. which is useful in meeting the goals of the program.
- When purchasing items, it is the responsibility of those designated for field purchases to obtain the SDS and if not already entered in our system to forward a copy to the Safety Department.
- The Safety Department will compile the master SDS file at Boldt's Corporate Office in Appleton, Wisconsin.
- Employees have the right to know about as well as review any SDS on file for hazardous chemicals/products used at the shop/warehouse facilities and/or jobsite.
- A SDS will be expected to either accompany the actual shipment of the chemical, or be mailed in a timely fashion to the individual responsible for ensuring that a SDS is obtained for all potentially hazardous chemicals utilized at the shop/warehouse facilities and/or jobsites. In the event a SDS is not received with the first shipment of a chemical, the responsible person in our company will contact that supplier/distributor via phone and request the appropriate SDS.
- A revised or updated SDS sent by a supplier(s) will replace an existing SDS and any new or significant health information contained in the revised SDS will be reviewed with the workers.



#### 4. EMPLOYEE TRAINING:

The new GHS rule went into effect on May 25, 2012 but compliance will take place in stages:

- Dec. 1, 2013: Deadline for training employees on the new label elements. Companies will start transitioning to GHS and they need to train employees to understand the new label warnings, particularly the pictograms.
- June 1, 2015: Classification, labeling and the SDS requirements. This is the same date that the European version of the GHS goes fully into effect. Distributors, however, may continue to ship products with the old labels until December 1, 2015.
- June 1, 2016: The other workplace requirements take effect. These include requirements for hazard communication program and training on newly identified hazards. Between now and then, companies can comply with old rule, new rule or with both.
- Training users of hazard information are an integral part of hazard communication. Systems should identify the appropriate education and training for GHS/HCS target audiences who are required to interpret label and/or SDS information and to take appropriate action in response to chemical hazards. Training requirements should be appropriate for and commensurate with the nature of the work or exposure. Key target audiences for training include workers, emergency responders, and those involved in the preparation of labels, SDS and hazard communication strategies as part of risk management systems.
- All employees exposed to hazardous chemicals will receive this information and training. All new employees will receive training as part of their new employee orientation.

#### 5. HAZARD IDENTIFICATION

##### Physical Hazards:

**Explosives**, which are assigned to one of six subcategories depending on the type of hazard they present, as used in the UN Dangerous Goods System.

**Flammable Gas** is one that has a flammable range in air at 20 °C and a standard pressure of 101.3 kPa. Substances and mixtures of this hazard class are assigned to one of two hazard categories on the basis of the outcome of the test or calculation method.

**Flammable Aerosols** should be considered for classification as Category 1 or Category 2 if they contain any component, which is classified as flammable according to the GHS criteria, that is, flammable liquids, flammable gases or flammable solids.

**Oxidizing Gases** are any gas that may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. Substances and mixtures of this hazard class are assigned to a single hazard category on the basis that, generally by providing oxygen, they cause or contribute to the combustion of other material more than air does.

**Gases under Pressure** are gases contained in a receptacle at a pressure not less than 280 Pa at 20 °C or as a refrigerated liquid. This endpoint covers four types of gases or gaseous mixtures to address the effects of sudden release of pressure or freezing which may lead to serious damage to people, property, or the environment independent of other hazards the gases may pose.

**Flammable Liquid** is a liquid with a flash point of not more than 93 °C. Substances and mixtures of this hazard class are assigned to one of four hazard categories on the basis of the flash point and boiling point.

**Flammable Solid** is one that is readily combustible or may cause or contribute to fire through friction. Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.

**Self-Reactive Substances** are thermally unstable liquids or solids liable to undergo a strongly exothermic thermal decomposition even without participation of oxygen (air). This definition excludes materials classified under the GHS as explosive, organic peroxides or as oxidizing.

**Pyrophoric Liquid** is a liquid that, even in small quantities, is liable to ignite within five minutes after coming into contact with air. Substances and mixtures of this hazard class are assigned to a single hazard category on the basis of the outcome of the UN Test N.3.

**Pyrophoric Solid** is a solid that, even in small quantities, is liable to ignite within five minutes after coming into contact with air. Substances and mixtures of this hazard class are assigned to a single hazard category on the basis of the outcome of the UN Test N.2.

**Self-Heating Substances** are solids or liquids, other than a pyrophoric substance, which, by reaction with air and without energy supply, is liable to self-heat. Substances and mixtures of this hazard class are assigned to one of two hazard categories on the basis of the outcome of the UN Test N.4.

**Substances which on Contact with Water Emit Flammable Gases** are substances that, in contact with water, emit flammable gases or solids or liquids which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities. Substances and mixtures of this hazard class are assigned to one of three hazard categories on the basis of the outcome of UN Test N.5, which measures gas evolution and speed of evolution. |

**Oxidizing Liquids** are liquids that, while in it is not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material. Substances and mixtures of this hazard class are assigned to one of three hazard categories on the basis of the outcome of UN Test O.2.

**Oxidizing Solids** are solids that, while it is not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material. Substances and mixtures of this hazard class are assigned to one of three hazard categories on the basis of the outcome of UN Test O.1.

**Organic Peroxides** are organic liquids or solids that contain the bivalent -O-O- structure and may be considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Substances and mixtures of this hazard class are assigned to one of seven 'Types', A to G, on the basis of the outcome of the UN Test Series A to H.

**Substances Corrosive to Metal** are substances or mixtures that by chemical action will materially damage, or even destroy metals. These substances or mixtures are classified in a single hazard category on the basis of tests (Steel: ISO 9328 (II): 1991 - Steel type P235; Aluminum: ASTM G31-72 (1990) - non-clad types 7075-T6 or AZ5GU-T66). The GHS criteria are a corrosion rate on steel or aluminum surfaces exceeding 6.25 mm per year at a test temperature of 55 °C.

## Health Hazards:

**Acute Toxicity** includes five GHS categories from which the appropriate elements relevant to transport, consumer, worker and environment protection can be selected. Substances are assigned to one of the five toxicity categories on the basis of LD<sub>50</sub> (oral, dermal) or LC<sub>50</sub> (inhalation).

**Skin Corrosion** means the production of irreversible damage to the skin following the application of a test substance for up to 4 hours. Substances and mixtures in this hazard class are assigned to a single harmonized corrosion category.

**Skin Irritation** means the production of reversible damage to the skin following the application of a test substance for up to 4 hours. Substances and mixtures in this hazard class are assigned to a single irritant category. For those authorities, such as pesticide regulators, wanting more than one designation for skin irritation, an additional mild irritant category is provided.

**Serious Eye Damage** means the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the front surface of the eye, which is not fully reversible within 21 days of application. Substances and mixtures in this hazard class are assigned to a single harmonized category.

**Eye Irritation** means changes in the eye following the application of a test substance to the front surface of the eye, which are fully reversible within 21 days of application. Substances and mixtures in this hazard class are assigned to a single harmonized hazard category. For authorities, such as pesticide regulators, wanting more than one designation for eye irritation, one of two subcategories can be selected, depending on whether the effects are reversible in 21 or 7 days.

**Respiratory Sensitizer** means a substance that induces hypersensitivity of the airways following inhalation of the substance. Substances and mixtures in this hazard class are assigned to one hazard category.

**Skin Sensitizer** means a substance that will induce an allergic response following skin contact. The definition for "skin sensitizer" is equivalent to "contact sensitizer". Substances and mixtures in this hazard class are assigned to one hazard category.

**Germ Cell Mutagenicity** means an agent giving rise to an increased occurrence of mutations in populations of cells and/or organisms. Substances and mixtures in this hazard class are assigned to one of two hazard categories. Category 1 has two subcategories. |

**Carcinogenicity** means a chemical substance or a mixture of chemical substances that induce cancer or increase its incidence. Substances and mixtures in this hazard class are assigned to one of two hazard categories. Category 1 has two subcategories.

**Reproductive Toxicity** includes adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in offspring. Substances and mixtures with reproductive and/or developmental effects are assigned to one of two hazard categories, 'known or presumed' and 'suspected'. Category 1 has two subcategories for reproductive and developmental effects. Materials, which cause concern for the health of breastfed children, have a separate category, Effects on or Via Lactation.

**Aspiration Hazard** includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration. Aspiration is the entry of a liquid or solid directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system. Substances and mixtures of this hazard class are assigned to one of two hazard categories this hazard class on the basis of viscosity.

**Specific Target Organ Toxicity (STOT)** [2] category distinguishes between single and repeated exposure for Target Organ Effects. All significant health effects, not otherwise specifically included in the GHS, which can impair function, reversible and irreversible, immediate and/or delayed are included in the non-lethal target organ/systemic toxicity class (TOST). Narcotic effects and respiratory tract irritation are considered to be target organ systemic effects following a single exposure. Substances and mixtures of the single exposure target organ toxicity hazard class are assigned to one of three hazard categories. Substances and mixtures of the repeated exposure target organ toxicity hazard class are assigned to one of two hazard categories.

### Target Organs

Each product or chemical used on project locations will be reviewed to determine the target organs that may be affected if these chemicals are used without protective measures or proper PPE. Target organs allow our bodies to function properly and any chemical that adversely affects those target organs should be considered hazardous. Many target organs work like the filters on cars by trapping substances that can harm our bodies. If these filters are plugged or not functioning properly our body's ability to fight disease will be greatly diminished. These hazards can be greatly reduced and even eliminated with the use of proper protective measures and in some cases by using safer chemicals or even finding a different way to accomplish the task at hand.

Below is a list of the possible target organs.

- **Liver;** (Hepatotoxic) Degeneration of the liver, liver poison, enlargement of the liver, hepatitis.
- **Kidneys;** (Nephrotoxins) Bladder symptoms, kidney poison, edema, urinary infection, degeneration of the kidneys
- **Central Nervous System;** (Neurotoxins) Depression, injury to the brain such permanent damage, unconsciousness or even a coma, decreased motor strength, lack of coordination, changes in or a slowing of your reflexes, damage to your nerves, increased heart rate, increased blood pressure,
- **Blood;** (Hematopoietic) Red blood cell damage, deprive the body tissue of valuable oxygen, leukemia, blood diseases, abnormal increase in red blood cells
- **Lungs;** Cough, tightness in the chest, shortness of breath, respiratory failure, pneumonia, asthmatic breathing, asthma, hemorrhaging irritation of the upper respiratory tract.
- **Cutaneous or skin hazards;** De-fatting of the skin (eliminates the skins protective barrier), itching, dermatitis, swelling, freeze burn, rashes, discoloration, thermal burns,
- **Eyes;** Corneal damage, inflammation of the iris, permanent eye damage, blindness, halos around lights, visual disturbances
- **Heart;** Heart attack, increased pulse rate, permanent damage to the heart
- **Reproductive Toxin;** Affects reproductive capabilities, may cause mutation, effects fetus, embryonic toxin, birth defects, sterility
- **Irritation;** Not corrosive but causes inflammatory effect, irritation of the skin, eyes, mucous membrane, gastrointestinal irritation
- **Sensitizer;** Allergic reaction after repeated exposure, difficulty breathing, wheezing, coughing, respiratory failure
- **Carcinogen;** Known to or suspected to cause cancer

## **6. HAZARDS OF NON-ROUTINE TASKS**

From time to time, employees will be directed to perform tasks of a non-routine nature that may expose them to certain chemical hazards. A non-routine task is defined as a work assignment that is performed no more than once a quarter or four times a year and involves chemical usage. Examples of such work may include confined space entry, major cleaning, equipment dismantling and inspections.

Prior to performing the non-routine tasks, the supervisor in charge must review the following:

1. The potential hazards associated with any new chemicals to be used during the task.
2. The need for any personal protective equipment.
3. The proper way to use the protective equipment.
4. How to react to and handle an emergency during the performance of the task.

Remember that any confined space entry must be carried out in accordance with the Boldt Confined Space policy. It is our policy, when assigning workers to non-routine tasks, to provide information on recommended maintenance and other practices which will allow the worker to perform these tasks in the safest manner possible. Specific instruction and identification of hazards associated with performing non-routine tasks will be given to workers by their supervisor. Any questions relating to non-routine tasks may be directed to the Safety Department.

## **TRADE CONTRACTOR/SUBCONTRACTOR**

Trade Contractors/Subcontractors, which would include temporary employment service employees, performing work on or within our property/jobsite will have access to the Hazard Communication Program, and will be advised of the presence of hazardous chemicals to which their employees may be exposed. Each trade contractor/subcontractor must have available on-site a copy of their Hazard Communication Program and any SDS for products/chemicals brought on-site. These must be readily accessible and available upon request. Any new or additional items that are considered hazardous must have a copy of the SDS forwarded to the Boldt Field Office prior to intended use.

## **MATERIALS**

Common raw materials forged or machined in the precision metal working industry do not contain hazardous components in sufficient quantities to produce hazardous releases under normal conditions of use. However, machining, grinding, and polishing of some raw materials and cutting tools are suspected of or have been shown to result in certain physical or health hazards if specific manufacturing procedures are not followed. When called upon to work with these materials, special precautions will be taken to protect employees. Precautions will include assuring that occupational exposure limits are determined and strictly followed and, in keeping with our overall operation, that adequate dust suppression and ventilation are provided.

We will rely on the hazard evaluation procedures and the resulting SDS supplied to us by our vendors to identify materials that require special handling procedures to protect the health and safety of employees.



**Safety Program**

E. Special Programs

Reviewed: January 4, 2019

Effective: May 2, 2011

## Heat Illness Prevention Program

### Policy

It is the policy of The Boldt Company that any employee who works outdoors in the heat and all individuals who supervise these employees must comply with the procedures in the policy and in the Injury and Illness Prevention Program. The objective of this program is employee awareness regarding heat illness symptoms, ways to prevent illness, and what to do if symptoms occur.

### Scope

To ensure that all employees are protected from heat illness while working on job tasks where environmental risk factors for heat illness are present and to establish the requirements for working in such an environment.

### DEFINITIONS

ACCLIMATIZATION: The temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for about two hours per day in the heat.

ENVIRONMENTAL RISK FACTORS FOR HEAT ILLNESS: The working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personnel protective equipment worn by employees.

HEAT ILLNESS: Refers to a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

PERSONAL RISK FACTORS FOR HEAT ILLNESS: Risk factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

POTENTIALLY IMPACTED EMPLOYEES: Employees whose job tasks expose them to environmental risk factors for heat illness.

PREVENTATIVE RECOVERY PERIOD: A period of time to recover from the heat in order to prevent heat illness.

SHADE: The blockage of direct sunlight. Canopies, umbrellas, and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning.

## **Responsibilities**

### Environmental Health And Safety (EH&S):

- Establish and update the written Heat Illness Prevention Program.
- Provide consultation/training to departments who fall within the Program.
- Assist departments in determining when, where, and how shade is provided.

### Managers And Supervisors:

- Identify and maintain records of all tasks/employees who are required to work outdoors where potential heat illness could occur and notify the EH&S office.
- Require all affected employees receive proper training on heat illness prevention and comply with all appropriate procedures.
- Maintain training records.
- Ensure that adequate water and shade are available at the job site when the environmental risk factors for heat illness are present.
- Contact Public Safety at 911 to request emergency medical services in the event medical assistance is required.

### Affected Employees:

- Awareness and compliance with all appropriate heat illness prevention procedures while performing assigned duties.
- Employees are ultimately responsible for drinking adequate amounts of hydrating fluids when the environmental risk factors for heat illness are present.
- Ensure access to a shaded area is available to recover from heat related symptoms.
- Inform their supervisor if shade and/or water are inadequate.
- Report symptoms of heat related illness promptly to their supervisor.
- Contact Public Safety at 911 to request emergency medical services in the event medical assistance is required.

## **Guidelines/Rules**

### Access To Water:

Employees shall have access to potable drinking. Where water is not plumbed, or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift. The frequent drinking of water, as described in the training section, shall be encouraged.

### Access To Shade:

Employees suffering from heat illness or believing a preventative recovery period is needed, shall be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than five minutes. Such access to shade shall be permitted at all times. Other methods of cooling, other than shade, can be used if it can be demonstrated that these methods are at least as effective as shade.

### Recordkeeping:

Training records shall be maintained by EH&S for a minimum of 3 years.

### Access To Records:

All records shall be provided upon request to employees, former employees, and representatives of employees.

## **Procedures**

### Identification Of Hazard:

All employees, and their supervisors, shall be identified who are required to work where environmental risk factors for heat illness are present. Identification of potentially impacted employees will be made at the department level and notifications will be made to EH&S.

### Potentially Impacted Employees:

Training shall be provided for all potentially impacted employees, and their supervisors, working where environmental risk factors for heat illness are present. Training information shall include, but not be limited to, the topics listed in the training section of this written program. All potentially impacted employees and their supervisors must be trained on the risk and prevention of heat illness, including how to recognize symptoms present.

### Employee Protection:

- One quart per hour of drinking water shall be available at all times, for each employee, for the duration of their shift, while working outdoors in the heat. Supervisors shall remind employees to drink frequently.
- Employees shall have access to a shaded area to prevent or recover from heat illness symptoms and where they can take rest breaks.
- Should an employee feel unusual discomfort from the heat, a preventative recovery period shall be offered to allow employees an opportunity to cool down and prevent the onset of heat illness

### Environmental Factors

Environmental factors such as air temperature, movement and relative humidity will be considered when creating engineering and work practice controls to reduce their impact such as blocking radiant heat with shade and facilitating air movement through ventilation.

Radiation is the transfer of heat from hot objects through air to the body. Working around heat sources will increase heat stress. Additionally, working in direct sunlight can substantially increase heat stress. A worker is far more comfortable working at 80° F under cloudy skies than working at 80° F under sunny skies. Shade will be used to block direct sunlight for preventive breaks, and reflective shields will block other radiant heat sources.

Humidity is the amount of moisture in the air. Heat loss by evaporation is hindered by high humidity but helped by low humidity. As humidity rises, sweat tends to evaporate less. As a result, body cooling decreases and body temperature increases.

Air movement affects the exchange of heat between the body and the environment. As long as the air temperature is less than the worker's skin temperature, increasing air speed can help labor stay cooler by increasing both the rate of evaporation and the heat exchange between the skin surface and the surrounding air.

### Physical Factors

Physical factors that contribute to heat related illness – workload, physical activity and duration, clothing, and PPE – will be considered when creating engineering and work practice controls to reduce their impact such as mechanical devices to reduce physical work and comfortable protective clothing.

The body generates more heat during heavy physical work. For example, construction labor shoveling sand or laying brick in hot weather generate a tremendous amount of heat and are at risk of developing heat stress without proper precautions. Heavy physical work requires careful evaluation even at



temperatures as low as 75° F to prevent heat disorders. This is especially true for labor who are not acclimated to the heat.

Heat stress can be caused or aggravated by wearing PPE such as fire - or chemical -retardant clothing. Coated and non-woven materials used in protective garments block the evaporation of sweat and can lead to substantial heat stress. The more clothing worn or the heavier the clothing, the longer it takes evaporation to cool the skin. Remember that darker clothing absorbs more radiant heat than lighter-colored clothing.

### Personal Factors

Supervisors will consider employee personal factors such as age, weight, fitness, drug and alcohol use, acclimatization, and previous heat-related symptoms when assigning tasks with potential heat related illness hazards.

## **Training**

### Level Of Training:

All employees working on job tasks where environmental risk factors for heat illness are present shall receive training. All supervisors whose employees perform said job tasks shall also receive training.

### Employees:

Training shall be provided for all employees working on job tasks where environmental factors for heat illness are present prior to being assigned to work tasks. Training shall include the following:

- Environmental and personal risk factors for heat illness.
- Procedures for identifying, evaluating, and controlling exposure to environmental risk factors for heat illness.
- The importance of frequent consumption of hydrating fluids, up to 4 cups of water per hour, when environmental risk factors for heat illness are present. Particularly when employee is excessively sweating during the exposure.
- The importance of acclimatization.
- Different types of heat illness and the common signs and symptoms of heat illness.
- The importance of immediately reporting symptoms or signs of heat illness, in themselves or in co-workers, to their supervisor.
- Understanding the procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by emergency medical service.
- Procedures for ensuring that, in the event of an emergency, clear and precise direction to the work site can and will be provided to emergency responders.

### Supervisors:

Supervisors shall receive training on the following topics to prevent heat related illnesses prior to being assigned to supervise outdoor employees.

- The training information required of the employees, detailed above.
- Procedures the supervisor is to follow to implement the provisions of this program.
- Procedures the supervisor shall follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

## **Audits**

### Responsibility:

Audits of the Heat Illness Prevention Program shall be performed by Supervisors and Safety personnel.

### Frequency:

Audits of the Heat Illness Prevention Program shall be performed at least annually.

### Contents:

- The audit shall review the program to ensure that heat illness prevention procedures are in place and are being properly followed.
- The audit process and findings shall be documented.

### Records:

All training, audit, and other records prepared in association with the Heat Illness Prevention Program will be maintained in the Boldt office trailer.

## **HEAT STRESS FACT SHEET**

High temperatures and humidity stress the body's ability to cool it, and heat illness becomes a special concern during hot weather. There are three major forms of heat illnesses: heat cramps, heat exhaustion, and heat stroke, with heat stroke being a life threatening condition.

### Heat Cramps

Heat cramps are muscle spasms which usually affect the arms, legs, or stomach. Frequently they don't occur until sometime later after work, at night, or when relaxing. Heat cramps are caused by heavy sweating, especially when water is replaced by drinking, but not salt or potassium. Although heat cramps can be quite painful, they usually don't result in permanent damage. To prevent them, drink electrolyte solutions such as Gatorade during the day and try eating more fruits like bananas.

### Heat Exhaustion

Heat exhaustion is more serious than heat cramps. It occurs when the body's internal air-conditioning system is overworked, but hasn't completely shut down. In heat exhaustion, the surface blood vessels and capillaries, which originally enlarged to cool the blood, collapse from loss of body fluids and necessary minerals. This happens when you don't drink enough fluids to replace what you're sweating away.

The symptoms of heat exhaustion include: headache, heavy sweating, intense thirst, dizziness, fatigue, loss of coordination, nausea, impaired judgment, loss of appetite, hyperventilation, tingling in hands or feet, anxiety, cool moist skin, weak and rapid pulse (120-200), and low to normal blood pressure.

Somebody suffering these symptoms should be moved to a cool location such as a shaded area or air-conditioned building. Have them lie down with their feet slightly elevated. Loosen their clothing, apply cool, wet clothes or fan them. Have them drink water or electrolyte drinks. Try to cool them down, and have them checked by medical personnel. Victims of heat exhaustion should avoid strenuous activity for at least a day, and they should continue to drink water to replace lost body fluids.

### Heat Stroke

Heat stroke is a life threatening illness with a high death rate. It occurs when the body has depleted its supply of water and salt, and the victim's body temperature rises to deadly levels. A heat stroke victim may first suffer heat cramps and/or the heat exhaustion before progressing into the heat stroke stage, but this is not always the case. It should be noted that, on the job, heat stroke is sometimes mistaken for heart attack. It is therefore very important to be able to recognize the signs and symptoms of heat stroke - and to check for them anytime an employee collapses while working in a hot environment.

The early symptoms of heat stroke include a high body temperature (103 degrees F); a distinct absence of sweating (usually); hot red or flushed dry skin; rapid pulse; difficulty breathing; constricted pupils: any/all the signs or symptoms of heat exhaustion such as dizziness, headache, nausea, vomiting, or confusion, but more severe; bizarre behavior; and high blood pressure. Advance symptoms may be seizure or convulsions, collapse, loss of consciousness, and a body temperature of over 108 degrees F.

It is vital to lower a heat stroke victim's body temperature. Seconds count. Pour water on them, fan them, or apply cold packs. Call 911 and get an ambulance on the way as soon as possible.

Take these precautions to prevent heat-related illnesses:

- Condition yourself for working in hot environments. Start slowly then build up to more physical work. Allow your body to adjust over a few days.
- Drink lots of liquids. Don't wait until you're thirsty! By then, there's a good chance that you're already on your way to being dehydrated. Electrolyte drinks are good for replacing both water and minerals lost through sweating. Never drink alcohol, and avoid caffeinated beverages like coffee and soft drinks.
- Take frequent breaks, especially if you notice you're getting a headache or you start feeling overheated. Cool off for a few minutes before going back to work.
- Wear light weight, light colored clothing when working out in the sun.
- Take advantage of fans and air-conditioners.
- With a little caution and a lot of common sense, you can avoid heat related illnesses.



## Safety Program

E. Special Programs

Reviewed: January 4, 2019

Effective: October 7, 2009

## Hexavalent Chromium Control Program

### Purpose

The purpose of the program is to control the exposure of Boldt employees to Hexavalent Chromium (Cr6 or CrVI), in compliance with 29 CFR 1926.1126.

### General Information

Chromium is a natural metal used in a wide variety of industrial activities including the manufacture of stainless steel and alloy metals, welding consumables and surface coatings. Medical studies have suggested that elevated exposure to Hexavalent Chromium may cause irritation to the skin, nose and throat, as well as lung damage. Employee exposure to Cr6 will be controlled to meet OSHA limits, which will be done, when feasible, through the use of engineering controls, work practices, or administrative controls. If those controls fail to reduce Cr6 levels below the OSHA Permissible Exposure Limit (PEL), or when the use of such controls are not feasible, respirators and other personal protective equipment will be required.

Each jobsite that has the potential for Cr6 exposure shall have a competent person who will determine the proper controls to be used and/or personal protective equipment required. Site-specific or project-specific rules and procedures may be in place at some jobsites that need to be considered. When these site or project specific rules and procedures conflict with this policy, the Boldt Safety Department will determine the proper course of action.

### Training

All Boldt employees who have the potential for exposure to Cr6 shall receive training on the proper procedures, as contained in this policy, as well as the company's Hazard Communication policy.

Some of the rules and procedures contained in these policies apply to other metals, such as arsenic, lead and cadmium. When applicable, these policies should be combined to address all hazards present at the jobsite. The initial training shall consist of the following:

- Health hazards associated with Cr6 exposure.
- Specific sources of exposures that exist at the jobsite.
- The purpose, proper use, and limitations of respirators.
- The purpose and description of the medical surveillance program.
- The engineering controls, work practices associated with the job assignment, and other measures employees can take to protect themselves.
- A review of the OSHA standard.

### Air Monitoring

Air monitoring has shown that during certain procedures the PEL may be exceeded without the use of proper controls or protective equipment. The task most commonly associated with elevated exposure to Cr6 is hot work (welding or cutting), involving chromium-containing alloys, especially stainless steel. Other potential exposures to Cr6 include welding, cutting and other hot work in the presence of fly ash or on boiler tubes containing Cr6, welding with welding rods containing Cr6, or stripping/blasting chromate-containing surface coatings.

When any new task is to be performed that has the potential for Cr6 exposure, an exposure assessment must be conducted to determine the need for a regulated area. This assessment shall be done using past and initial sampling, as well as bulk samples of the base material, to determine the need for a regulated area. Employees shall wear personal protective equipment during initial monitoring, which must continue until it has been determined that the area can be deregulated.

Exception:

Where Boldt has objective data demonstrating that a material containing chromium or a specific process, operation, or activity involving chromium cannot release dusts, fumes, or mists of chromium (VI) in concentrations at or above 0.5 micrograms per cubic meter as an eight (8) hour time-weighted average (TWA) under any expected conditions.

Air monitoring shall be based on and identify the following:

- Job location
- Welding process and time spent welding
- Type of base metal and type of wire
- Amount of wire used per shift
- Ventilation conditions

Air monitoring shall be performed at the beginning of each project where exposure to airborne Cr6 is possible to determine if employees may be exposed at or above the action level. It is important that air monitoring be representative of each task to be conducted (i.e.: air monitoring conducted during grinding work cannot be used to represent exposure present during welding work).

If initial, representative, full-shift, (at least seven hours), personal air sampling indicates exposure below the AL, sampling may be discontinued and the area may be deregulated.

If initial, representative, full-shift, personal air sampling indicates exposure between the AL and the PEL, the area may be deregulated.

If initial, representative, full-shift, personal air sampling indicates exposure above the PEL, the area must be regulated. Engineering controls must be implemented in an effort to reduce employee exposures below the PEL. After controls are implemented, personal air sampling must be repeated immediately.

OSHA requires sampling to be repeated at least every six months if above the AL and every three months if above the PEL or until two samples collected at least seven days apart show the exposures to be less than the AL. If, after sampling has been discontinued, the procedures, equipment, or materials change in such a way as to possibly increase the exposure to Cr6, then sampling must be reinstated.

### **Controlling Exposure**

When feasible, engineering controls must always be used for reducing exposure to Cr6.

Ventilation is the most common engineering control. General ventilation by opening stack dampers or running ID fans or other fans to move air in the boiler, tank, or vessel.

Local ventilation using vents, air movers, and/or fume extraction equipment to move welding fumes or dust away from employees. Work methods can also be used as a means to control levels of dust or fumes. Employee work practices, such as, position and proximity to fumes should be used wherever possible.

Washing and/or vacuuming the boiler, vessel, or tank prior to work being performed can be effective in reducing workers' potential exposure to Cr6.

Chromium containing coatings should be removed with a chemical stripper or a power tool, such as a needle gun, that utilizes a HEPA attachment prior to performing hot work or other activities that can create fumes or dust. When removing a section of chromate coating prior to cutting or other hot work, sufficient coating shall be removed to prevent bubbling or vaporizing when hot work is performed.

### **Establishing Regulated Areas**

If initial air sampling indicates exposure at or above the PEL, the area must be regulated and access to that area must be limited to authorized personnel only.

The regulated area shall be marked to prevent entry by unauthorized personnel.

Signs shall be posted at each entrance of the regulated area that read the following:

DANGER  
Chromium (VI)  
CANCER HAZARD  
CAN DAMAGE SKIN, EYES, NASAL  
PASSAGES, AND DAMAGE TO LUNGS  
AUTHORIZED PERSONNEL ONLY  
RESPIRATOR IS REQUIRED

There shall be no eating, drinking, smoking, chewing gum when working in areas regulated for Cr6.

### **Personal Protective Equipment (Ppe)**

When employee exposures to Cr6 are over the PEL, the following personal protective equipment must be used:

- Respirators meeting the requirements of this section
- Coveralls or similar full-body work clothing
- Head covers
- Gloves
- Eye/Face protection

### Respirators will be required for the following:

- When exposures exceed the PEL
- When engineering or administrative controls do not reduce exposure below the PEL, or controls are not feasible
- When an employee requests a respirator
- When employees must enter regulated areas
- As interim protection during exposure assessments or during installation of controls

**Respirator selection must be made based on the following chart:**

Airborne Concentration	Required Respirator Type
10 x PEL or less	Half-face air-purifying respirator with P-100/HEPA filters
25 x PEL or less	Powered air-purifying respirator (PAPR) with loose fitting hood or helmet equipped with P-100/HEPA filters, or supplied-air respirator with a loose fitting hood or helmet face piece operated in the continuous-flow mode.
50 x PEL or less	Full face piece air-purifying respirator equipped with P-100/HEPA filters, or a PAPR with a tight-fitting half mask equipped with P-100/HEPA filters, or a supplied-air respirator with a tight fitting half mask operated in the continuous-flow mode.
250 x PEL or less	PAPR with a tight-fitting face piece equipped with P-100/HEPA filters or a supplied-air respirator with a tight-fitting full face piece operated in the continuous-flow mode.
1000 x PEL or less	Supplied-air respirator with half mask or full face piece operated in the pressure-demand or other positive-pressure mode.
>1000 x PEL or unknown	Self-contained breathing apparatus with a full face piece operated in the pressure- demand or other positive-pressure mode, or a supplied-air respirator with a full face piece operated in the pressure-demand or other positive-pressure mode, and equipped with an auxiliary escape-type self-contained breathing apparatus operated in the pressure-demand mode.

**Required Respirator Type**

Half-face air-purifying respirator with P-100/HEPA filters Powered air-purifying respirator (PAPR) with loose fitting hood or helmet equipped with P-100/HEPA filters, or supplied-air respirator with a loose fitting hood or helmet face piece operated in the continuous-flow mode.

Full face piece air-purifying respirator equipped with P-100/HEPA filters, or a PAPR with a tight-fitting half mask equipped with P-100/HEPA filters, or a supplied-air respirator with a tight fitting half mask operated in the continuous-flow mode. PAPR with a tight-fitting face piece equipped with P- 100/HEPA filters or a supplied-air respirator with a tight-fitting full face piece operated in the continuous-flow mode. Supplied-air respirator with half mask or full face piece operated in the pressure-demand or other positive-pressure mode. Self-contained breathing apparatus with a full face piece operated in the

Pressure-demand or other positive-pressure mode, or a supplied-air respirator with a full face piece operated in the pressure-demand or other positive-pressure mode, and equipped with an auxiliary escape-type self-contained breathing apparatus operated in the pressure-demand mode.

All respirator use shall be in accordance with Boldt's Respiratory Protection Policy.

Employees required to wear respiratory protection shall be issued a respirator and fit-tested only after a medical evaluation questionnaire has been completed, reviewed and approved by a physician or other licensed health care professional.

Every respirator wearer shall receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Respirators shall not be worn when conditions prevent a good face seal. Such conditions may be: a growth of beard, sideburns, a skull cap that projects under the face piece, or temple pieces on glasses. Also, the absence of one or both dentures can seriously affect the fit of a face piece. The worker's diligence in observing these factors shall be evaluated by periodic checks. To assure proper protection, the Face piece fit shall be checked by the wearer each time he puts on the respirator. This may be done by following the manufacturer's face piece fitting instructions.

If an employee has demonstrated difficulty in breathing during the fitting test or during use, he or she shall be examined by a physician trained in pulmonary medicine to determine whether the employee can wear a respirator while performing the required duty or assign employee to a task not requiring a respirator. Fitting instructions must be documented.

If previous monitoring results are not available, and respirator requirements are not clear, consult the Boldt Safety Department for necessary guidance.

- PPE supplied can be disposable or re-useable.
- Reusable PPE would include cloth coveralls, cloth or leather gloves, and cloth hoods.
- Disposable clothing includes paper or synthetic clothing, shoe covers, and head covers.
- When performing hot work, appropriate coveralls shall be used.

Protective clothing and equipment shall be cleaned, laundered, repaired, or replaced as necessary to maintain their effectiveness.

Disposable clothing may be used more than once as long as the integrity of the clothing is not impaired.

When laundering reusable clothing, the laundry services must be notified of the presence of Cr6 contamination.

### **Hygiene Facilities And Practices**

Secondary routes of exposure include skin absorption and ingestion. Cr6 in the welding fume condenses and settles on the skin and other surfaces. This can be transferred from the hands and other objects to the mouth, nose and eyes and can also be spread to other areas.

- To prevent employees working in regulated areas from spreading contamination to other areas of the work place and to their homes. The following practices shall be used:
- Change areas should be provided to employee for storage of non-contaminated clothing. This area must be located outside regulated areas.
- When leaving the work area during the work shift, all personal protective equipment shall be HEPA vacuumed, removed, and left outside of the entrance to the regulated area.
- Employees shall wash their hands and face before eating, drinking, or smoking.
- Compressed air may not be used as a decontamination method. Contaminated clothing that will not be re-used must be stored in sealed containers or bags.



## **Waste Disposal**

Waste disposal procedures for projects must be developed and coordinated with the site's Environmental Coordinator.

## **Medical Surveillance**

Medical surveillance shall be conducted for employees who are exposed at or above the action level for thirty (30) or more days per year, or those employees who are exposed. Boldt shall provide employees the opportunity for an examination by a physician that shall meet the requirements of the medical surveillance program in 29 CFR 1926.1126. Contact the Boldt Safety Department for assistance in determining the need for a medical surveillance program.

## **Recordkeeping And Notification**

### Exposure Monitoring Records

Cr6 exposure monitoring records must be kept for the duration of employment plus thirty (30) years.

### Medical Surveillance Records

Cr6 medical surveillance records must be kept for the duration of employment plus thirty (30) years.

### Training Records

OSHA requires that training records shall be kept at least until the next refresher is completed.

### Exposure Assessment Information

Any objective data used to determine exemptions from initial monitoring or any other data used in exposure assessments must be kept for thirty (30) years.

### Notification

When the Boldt Safety Department or project supervision responsible for notification receives results of air monitoring, biological monitoring, or medical findings or opinions, the employee shall be notified of the results within five (5) working days.

## **Testing Laboratory**

All testing will be sent to a certified laboratory to determine action and PEL levels.

## **DEFINITIONS**

Action Level - (A.L.): A concentration of Hexavalent Chromium of 2.5 micrograms per cubic meter of air averaged over any eight (8) hour period (2.5 mg/m<sup>3</sup>).

Permissible Exposure Limit (P.E.L.): A concentration of Hexavalent Chromium of 5 micrograms per cubic meter of air averaged over any eight (8) hour period (5.0 mg/m<sup>3</sup>).

Competent Person: A person who is, by training and/or experience capable of identifying the hazards associated with the presence or possible presence of Hexavalent Chromium and who has authority to take prompt corrective measures to eliminate them.



## Safety Program

E. Special Programs

Reviewed: January 4, 2019

Effective: May 21, 2001

## Lead, Cadmium, and Other Metals Awareness

### Purpose

The object of this written Lead, Cadmium and Other Metals Awareness Program is to prevent the unnecessary absorption of harmful quantities of metals and their compounds by reducing exposures to below the permissible exposure limits (PEL). In order to protect the health and safety of our employees, strict adherence must be followed regarding Boldt's Respirator Protection Program, along with certain precautions featured in this program.

### Poisoning

Lead is a toxic substance. Its compounds are known carcinogens, and lead poisoning is one of the most common occupational diseases. An exposure to lead can be very misleading because lead/cadmium is a cumulative poison. It serves no biological function for the human anatomy. The half-life of radioactive lead is 21 years, and the effects of lead poisoning may not become apparent until years of exposure have passed.

Cadmium fumes and dusts primarily affect the respiratory tract when inhaled; the kidneys may also be affected. Brief exposure to high concentrations may result in pulmonary edema and death. Several factors are involved to determine toxicity of an exposure for individuals. They include, but are not limited to:

- Solubility of the compounds in body fluid
- Conditions surrounding the exposure
- Size of particles, mists, fumes, vapors
- Individual susceptibility

### Health Effects

Routes of entry:

- Inhalation of respirable dust
- Ingestion while eating, drinking, or using tobacco products
- Direct contact on mucous membranes

Targeted organs and organ a system includes:

1. Lungs
2. Kidneys
3. Blood
4. Muscle tissue.
5. Gastro-Intestinal tract.
6. Gingival tissue
7. Reproductive organs
8. Central Nervous System

Symptoms and side effects:

1. Anxiety
2. Weakness

3. Headaches
4. Tremors
5. Vertigo
6. Anemia
7. Exhaustion
8. Insomnia
9. Paleness
10. Anorexia
11. Low weight
12. Malnutrition
13. Constipation
14. Abdominal pain
15. Hypertension
16. Irritation (eyes)
17. Joint soreness
18. Loss of appetite
19. Metallic taste
20. Others

### **Areas Of Construction**

Many different trades are affected by metals and their toxic compounds since it is not confined to the area of work and has been used for centuries. Exposure to metals containing toxins is not limited to direct contact. Areas that are affected by these metals include roofing, electrical work, demolition, renovation, painting, plumbing, ductwork, steel erection, etc.

Operations such as abrasive blasting, sanding, burning, cutting, or welding on steel structures coated with lead/cadmium or other metals containing paint can produce extremely high concentrations of lead dust and/or fumes. Certain construction activities have exceeded 100 times the PEL (permissible exposure limit) of 50 micrograms per cubic meter (50ug/m<sup>3</sup>) for lead and 2.5 micrograms (2.5ug/m<sup>3</sup>) for cadmium per OSHA standards. Particular attention is warranted when employees leave a work site since homes, automobiles, and family may be exposed.

### **Hazard Controls**

Engineering controls are administered to minimize and/or eliminate concentrations to an acceptable measure lower than the PEL and OSHA's time-weighted average of 50 ug/m<sup>3</sup> for lead and 2.5ug/m<sup>3</sup> for cadmium. Whenever feasible, controls will include:

- Material substitution
- Process and equipment modification
- Isolation or automation

Warning signs will be posted to mark the boundaries of contaminated work areas where the PEL is exceeded. These signs must heed the use of personal protective equipment and prohibit eating, drinking, and using tobacco products in the designated area.

Local and/or general exhaust ventilation must be used when working with lead/cadmium containing materials.

Wear proper protective equipment (PPE) at all times, while working in the designated area.

Employees will be trained and informed of hazards of working with lead/cadmium and its compounds. Included in this will be rules, policies and procedures regarding the potential and how to limit exposure.

## **Work Practices**

Employees will not disturb lead containing material unless necessary. This includes avoid stirring up lead-containing dust with dry sweeping or compressed air in favor of safer cleaning practices, wet cleaning and vacuuming using HEPA filters.

Surface preparation will be done to ensure that minimal amounts of dust will be generated when chipping, grinding, abrasive blasting, or during other operations to remove lead/cadmium containing paint. Such methods include scraping, heating while scraping, chemical removal, or needle guns. Blasting techniques that produce less dust include centrifugal, vacuum blasting, or the wet method approach.

Metals coated with lead/cadmium containing materials will have their protective coating removed at least 6" from the area that will be heated during welding, cutting, or burning operations. Containment structures used during blasting operations will be properly ventilated to decrease lead/cadmium or other metals exposure and to increase visibility. An employee working inside a containment structure must perform the operation upstream from the blasting to ensure minimal exposure.

Personal protective equipment must be worn when working in contaminated areas. Keep work area clear of dust and debris. Dispose of personal protective equipment and clothing in closed containers especially designed for such purposes. DO NOT brush, shake, blow, or vacuum yourself in order to decontaminate yourself of lead/cadmium.

Parking for automobiles must be in a conspicuous location so vehicles will not become contaminated with lead/cadmium or its compounds. Work cannot be done in an area until vehicles have been removed from the designated area.

## **Personal Hygiene**

Employees exposed to lead/cadmium and its components must wash their hands and faces before leaving for break, or prior to eating, drinking, and using tobacco products.

Eating, drinking, using tobacco products and applying cosmetics are prohibited within the contaminated work area. A separate lunch/break area and washing facility, shower and other necessary hygiene facilities (when feasible) will be made available to employees exposed to potential lead/cadmium and its components above the PEL.

Employees will change in/out of personal protective equipment at the worksite. Disposable coveralls, respiratory protection, and storage facilities will be supplied to employees working in the contaminated area. Employees will not be allowed to leave until they have changed and been decontaminated to prevent the accumulation of potential lead/cadmium dust in the workers' cars and homes, to protect family members from exposure. Clothing and personal protective equipment will be disposed of by Boldt according to federal, state, and local regulations.

## **Personal Protective Equipment**

Personal protective equipment is mandatory when working in potentially contaminated work areas to minimize the exposure to lead/cadmium.

Personal protective equipment consists of, but is not limited to, respirators (Dust, positive pressure, etc.), gloves, coveralls, shoe coverlets, face shields, and goggles. All PPE will be provided at no cost to employee.

Respirator protection will be selected according to Boldt's Respiratory Protection Program. Respirators will be available and used when necessary while installing or implementing engineering

and work practice controls, when engineering and work practice controls are insufficient, and in emergencies. Respirators will be worn before entering the contaminated work area and removed only after leaving that area.

### **Medical Evaluation**

All employees who are potentially exposed to lead/cadmium and their compounds will be monitored by the use of medical surveillance. Free medical surveillance including blood sampling and monitoring for lead will start for any employee who may be exposed to the action level of 30 ug/m<sup>3</sup> for more than 30 days.

Blood sampling and monitoring will be conducted every six months for employees and employees will be removed from the work environment if their blood level is tested at 60 ug/100 g of whole blood once, an average of the last three tests at 50 ug/100 g of whole blood, or a physician makes a medical determination. If possible, a baseline must be established for any future comparisons.

Employees will be notified in writing within five days of their blood level and temporarily removed from the exposure area and have their blood tested every month until blood lead levels lower

Sampling and testing will be done by an approved laboratory selected by Boldt. Elevated cases of blood lead levels (BLLs) must be properly reported.

A qualified physician or health care professional will conduct interviews, examinations, and evaluations at least on an annual basis for individuals who are exposed to lead/cadmium.

Certain requirements will be made regarding any medical protection as directed by the treating physician. These actions will coincide with OSHA's General Industry Standards for various lead/cadmium concentrations in blood.

Medical record keeping for each employee will be retained for the duration of employment plus 30 years.

### **Training**

All employees who are potentially exposed to lead/cadmium will receive information and training about the health effects of lead/cadmium exposure, lead/cadmium poisoning, and all other relevant information before their first job assignment and then annually after (Appendices A and B of the standard).

Training will cover how they may be exposed to lead/cadmium at the worksite, respirators (purpose, selection, fitting, use, and limitations), any controls (engineering, work practice), and the medical surveillance program (purpose, description, medical removal).

Employees will be trained in Hazard Communication, health effects of lead/cadmium, personal hygiene procedures, use/care of personal protective equipment (including clothing and respiratory protection), and proper work practices.

Employees will be informed of the boundaries and the signs marking the lead/cadmium contaminated work area. Employees will take notice of these signs and strictly adhere to them. Disciplinary measures will be taken if proper procedures are ignored.

Training records and all other pertinent information will be retained for the duration of employment plus 30 years.

### **Air Monitoring**

Workers shall not be exposed to airborne concentrations of lead greater than the Permissible Exposure Limit (PEL) of 50 ug/m<sup>3</sup>.

Areas where workers are potentially exposed to airborne concentrations at that level will undergo air monitoring to determine the exposure. These full shift personal samples will represent the employees' regular daily exposure to lead.

Affected employees will be told the results within 15 working days by posting in an easily acceptable location appropriate for the affected employees. For any exposure that exceeds the PEL, there will be a statement that the PEL was exceeded along with the correction actions to reduce exposure below the PEL.

If air monitoring shows exposure above the action level of 30 ug/m<sup>3</sup>, air monitoring will be completed at least every six months until two consecutive measurements – taken at least 7 days apart – are below the action level.

### **Multi-Contractor Sites**

If Boldt employees are working near a lead abatement activity and are exposed to lead due to inadequate containment, the employees will be either immediately removed from the area until the enclosure breach is repaired or perform an initial exposure assessment and reduce their employees' exposure to safe levels.



**Safety Program**

E. Special Programs

Reviewed: January 4, 2019

Effective: May 17, 2001

## Lightning Policy and Procedure

### Purpose

This procedure applies to all Boldt personnel (field and office) and any Boldt subcontractor employees working on Boldt projects.

All employees shall be trained and understand Boldt’s Lightning Policy and Procedures for their location, which includes what shelters are available to them and how hazardous weather will be communicated to them.

Prior to beginning any outdoor work activities, Boldt supervision shall check weather reports and forecasts for the possibility of weather hazards. If weather conditions will impact the work location, Boldt supervision may need to reschedule work activities to avoid workers being caught outside in hazardous conditions. When working outdoors and if weather hazards are possible, supervisors shall monitor weather conditions. Workers can observe the sky and environment for changing conditions with any concerns being communicated to supervision. Boldt supervision shall establish a means of communication to effectively communicate to all employees at the work site of hazardous weather within a reasonable amount of time.

Boldt supervision shall identify a service (website, app, warning or detection system) and monitor the weather for hazardous activity including lightning strikes. The Boldt Company does not endorse any specific service and does require that the service:

- Provide real time weather forecast and lightning strike data
- Show the distance between the lightning strike and your location
- Identifies cloud-to-ground lightning and lightning within cloud activity

The phone app “WeatherBug” has all the features identified above to help track lightning strikes. While Boldt does not endorse any specific service, Boldt supervision has had success using WeatherBug on past projects. Please be aware that technology is always evolving and changing, and it is best to identify the service the project will be using and to check it periodically for changes and updates. If there are different services utilized by different contractors and there is a difference in distance of the lightning strike to the work location, the service with the closest distance of the strike to the work location shall be used.

Lightning detected within **30 miles** of the work location:

- A general warning will be communicated to site personnel that severe weather is approaching. Employees involved in crane, aerial work platform and elevated work, shall begin to make preparations to secure materials and the work area in preparation for hazardous weather.

Lightning detected within **20 miles** of the work location:

- All work involving the use of cranes, aerial work platforms, any piece of equipment that extends towards the sky and any employee working in an elevated area outside of a permanent (fully enclosed and grounded) building, shall be shut down. Employees shall ensure that all work is left in a safe condition.

Lightning detected within **10 miles** of the location:

- All employees working outside, or in non-grounded structures, shall take shelter in a designated location.

When communicated, employees working outside or in a non-approved shelter/structure are to go inside a grounded building or designated shelter. Designated shelter locations may vary by project and location. Some examples of designated shelters include, but are not limited to:

- Fully enclosed permanent buildings with plumbing and/or electrical service are the safest location during lightning strikes.
- If the grounded building is under construction, and if the roof and exterior walls are completed with windows and doors installed and closed, should the building under construction be considered safe. Employees shall stay in the center of the building away from doors, windows, electrical wiring and plumbing.
- Construction trailers that are completely enclosed and grounded.
- If an adequate building/structure is not available, the next best place for shelter is an enclosed metal car, truck, van or trailer, but NOT a tractor, golf cart, topless or soft-top vehicle. Make sure the vehicle is not parked near trees or other tall objects. When inside a vehicle during a lightning storm, roll up the windows and sit with your hands in your lap and wait out the storm. Don't touch any part of the metal frame or wired device.

All outside work activities shall remain shut down and all personnel shall remain in the designated areas until Boldt supervision has given an "all clear." When lightning detection services have not detected a lightning strike within 10 miles of the work location for a period of 30 minutes, Boldt supervision can give an all clear to work outside at ground level.

When lightning detection services have not detected a lightning strike within 20 miles for a period of 30 minutes, Boldt supervision can give an all clear to resume use of cranes, aerial work platforms, extending equipment and elevated work.

For large or spread out projects, Boldt supervision must account for the time it will take for: workers to get down from elevated positions, getting equipment into a safe position, or workers traveling to a safe location. If it is anticipated that these activities may take a longer time to accomplish, and detection services indicate that hazardous weather is in the direction of the project, Boldt supervision may need to initiate procedures prior to the 20 and 10-mile detection and provide workers the time to get to a safe location.

Work inside of buildings can continue if the building is permanent, fully erected and enclosed with building protection systems and grounding systems in place and functioning. However, there are some activities that may still be at risk while working in an enclosed and grounded building. Do not use corded phones as lightning can travel through phone lines. Indoor work on metal pipes and electrical wiring or systems shall stop until an all clear is communicated.



## Lockout/Tag out

### Purpose

This procedure establishes the requirements for the lockout-tag out of energy isolating devices. This procedure will be used to ensure that the machine or equipment is isolated from all potentially hazardous energy, and is locked and tagged before an employee performs any servicing or maintenance activities where the unexpected energization, start-up, or release of stored energy could cause injury.

### Responsibility

The project manager and superintendent have the overall responsibility for the implementation and functioning of the lockout-tag out program. The authorized lockout-tag out coordinator in charge of the lockout-tag out procedure will be responsible for helping employees locate, lockout, and tag valves, switches, etc. through the owner's authorized representative. It is the responsibility of the Safety Department to conduct periodic inspections of the performance of the lockout-tag out procedures at least annually. Documentation of the audit must be completed on and kept on file.

### Training

Each employee who will be involved in the lockout-tag out procedure must be trained by the designated lockout-tag out coordinator prior to performing work on any mechanical, electrical system, etc. This may include millwrights, ironworkers, laborers, carpenters, pipefitters, cement finishers, masons, electricians, plumbers, operating engineers, boilermakers, etc. Any additional employees whose work operations may be in an area where energy control procedures are necessary must receive training. All training must include recognition of hazardous energy sources, types and magnitude of energy, methods and means required for energy isolation and control. Regarding the use of locks and tags training will cover their limitations, along with the procedure that will be implemented, and that tags are not to be ignored, bypassed, or removed without authorization. Employees authorized to conduct individual and group lockout tagout procedures will receive adequate training so they understand all affected employees are instructed in the purpose and use of the energy control procedures. All training and retraining is to be documented.

Retraining is required when there is a change in energy control procedures, change in equipment/machines, or any other significant hazard that may change the lockout-tag out procedure.

### Preparation For Lockout-Tagout Procedures

The authorized lockout-tag out coordinator will conduct a survey to locate and identify all isolating devices to be certain which switch(es), valve(s), or other energy isolating device(s) apply to the equipment to be locked and tagged out. The lockout-tag out procedure involves, but is not limited to:

- Kinetic energy such as blades, belts, and flywheels.
- Potential energy includes springs in air brake cylinders, actuators, counterweights, and raised loads.
- Electrical energy involves power transmission lines, transformers, circuit breakers, motors, etc.
- Hydraulic energy covers lift trucks and cylinders.
- Pneumatic energy involves air under pressure.
- Pressurized liquids and gases, including steam and chemicals present in pipes and supply lines, storage tanks, and vessels.

Lockout-tag out procedures may also involve digesters, sewers, etc. The coordinator must understand the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy. The coordinator may utilize the Equipment Listing & Survey Report to record what specifically is being locked/tagged out, the location of the equipment and/or bucket/valve, etc. (Exhibit A).

### **Lockout-Tagout Restrictions**

- Lockout and tag devices must be singularly identified and be the only devices used for controlling energy. These locks and tags cannot be used for any other purpose.
- Lock and tag devices must be able to withstand use in any kind of environment. It must be ensured that tags used in adverse conditions will not deteriorate, making the message on the tag illegible.
- Lockout requirements are not met by just the removal of fuses.
- Locks and tags must include the name of the person who placed the device.
- Locks and tags are not to be removed by any other person except the individual who applied the device(s).
- Employees cannot rely on another employee's lock and tag device to lock and tag out equipment.
- Each employee must verify that the energy source has been de-energized and any potential energy has been released before performing work operations.

### **Sequence Of Lockout-Tagout System Procedure**

- Notify all affected employees that a lockout-tag out system is going to be utilized and the reason for it. Before turning off the machine, the authorized employee must know the type and magnitude of energy that the machine or equipment uses and must understand the hazards thereof.
- If the machine or equipment is operating, specific shut down procedures (job-specific) must be implemented. An owner/client representative, their designated person, is to be responsible for the de-energization of any machine(s) and/or equipment.
- All energy isolating devices will be operated so the machine or equipment is isolated from any energy source.
- STORED ENERGY (such as that in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, disconnecting, etc. As long as stored energy can re-accumulate, verification of isolation will continue until the servicing is completed.
- Once the switch, valve, or other energy isolating device(s) is closed and/or isolated, the equipment must be simulated as normally operated to verify that the equipment is isolated from its energy source(s).
- The lockout device must be affixed to each energy-isolating device. This must be performed by only authorized employees. The lockout devices, when used, must be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position. "Danger-Do Not Operate" tags, or equivalent, are to be attached to each locking device (Exhibit B). The tag(s) must be durable (i.e. weather and/or chemical resistant). Each of these tag(s) must identify the name of the employer with an additional system providing identification of each employee.

### **Group Lockout**

If more than one individual is required to lockout and tag out the equipment, each person has to place his/her own personal lockout-tag out device on the energy isolating device(s). When an energy-isolating device cannot accept multiple locks or tags, a multiple lockout or tag out device (hasp) must be used (Exhibit C). As each person no longer needs to maintain his or her lockout-tag out protection,

that person will remove his/her lockout/tag out device. EMPLOYEES CANNOT REMOVE THE LOCKOUT-TAGOUT DEVICE OF ANOTHER EMPLOYEE. Each employee must remove their lockout-tag out device when completing their shift.

A lockout lock box may be used in place of a multiple lockout device. Each employee of a crew will be notified that a lock box will be utilized and the reasons for it. There will be one authorized employee who has primary responsibility for all the individual employees working under the protection of the lock box. The authorized employee is responsible for determining the exposure status of each employee throughout the lockout procedure including startup. After the equipment is locked out by the authorized person, they will put the key for these locks in a special "lockout lock box". This box will be designed to be locked by multiple locks. After the key is placed inside of this box, each employee on the crew will place their own lock on the box.

- Before any circuits or equipment can be considered de-energized, the following procedures must be followed:
  - a. If the piece of equipment that is necessary to lockout is in the energized position, the person wanting to lockout is required to contact the lockout/tag out coordinator who will contact the owner/client representative and check to see if that piece of equipment can be de-energized and locked out. If the OK is given by the owner/client representative, he/she or their designated representative will throw the switch to de-energize the piece of equipment. The same procedure would apply when required to lockout a valve or other device that is in the energized position.
  - b. A qualified person must operate the equipment operating controls or otherwise verify that the equipment cannot be restarted. Always return operating controls to "neutral" or "off" position after testing.
  - c. A qualified person must use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are de-energized.
  - d. The test equipment must be checked for proper operation immediately before and immediately after this test.
- In the event a lockout device cannot be utilized, a tag out system is to be implemented. A tag used without a lock must be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device. The tag out device is to be affixed so it will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited. Employees are to be trained in the following limitations of the tag out system:
  - Tags are warning devices and do not provide the physical restraint a lock does
  - The tag is not to be removed without authorization of the person responsible for it
  - Tags must be legible, understandable, and made of a material which will withstand the environmental conditions
  - The tag is to be securely attached so that it cannot be inadvertently detached during use. Where a tag cannot be affixed directly to the energy isolating device, the tag is to be located as close as safely possible to the device in a position immediately obvious to anyone attempting to operate the device.
- The system is now properly locked/tagged out.

## Sequence To Safety Testing Or Restoring Machines To Normal Operation

- When working on equipment that requires "inching" or "jogging" to move parts for adjustment or maintenance, special attention at the energy source must be continued until work is completed. Special attention involves an employee stationed at the primary disconnect switch (the energy source) in the event the secondary switch would fail during "inching" and "jogging."
- After the servicing and/or maintenance is complete and equipment is ready for normal operations, check the surrounding area around the machines or equipment to eliminate any potential exposure.
- After all tools have been removed from the machines or equipment, guards have been reinstalled and employees are in the clear, the designated lockout-tag out coordinator must be notified for the removal of the tag and lock. After removal of all lock(s) and tag out devices, the energy must be restored to the machine or equipment.

## If An Employee Forgets To Remove A Lock And Tag

No employee may remove the lock and tag of another employee. The exception to this is when an employee has forgotten to remove his/her lock and is not available to do so.

The designated lockout-tag out coordinator is the **ONLY** person who may remove a lock or tag.

If a lock/tag is inadvertently or negligently left on a piece of equipment that needs to be run, the designated lockout-tag out coordinator will contact, or attempt to contact, the employee, the foreman, and/or superintendent to obtain removal of the lock. Every attempt must be made to contact the employee or to verify that the employee is not on-site. If this is not possible, the start-up unit and operator of the equipment will make a thorough check of the equipment and system to insure that it is safe to be energized. The coordinator must utilize the Lock Removal Form, or equivalent, for documentation (Exhibit D). At that point, the lock would be forcibly removed. Prior to returning to work on-site, the employee shall be made aware that the lock/tag has been removed and that appropriate disciplinary actions will be taken. The use of two-way radios during start-up and especially during a lock-breach operation is recommended. One radio at lock-out point, one at actuation point (if different), and one at unit are recommended.

The forcible removal of a lock is a serious situation requiring that all precautions be made by the start-up unit and operator prior to cutting a lock. The seriousness of the situation requires that documentation be made of the need to forcibly remove a lock and forwarded to project management for investigation and corrective action.

Forcibly removing a lock, throwing of a tagged switch, or activation of a tagged valve without proper authority or safety precautions, will be viewed as a primary, willful safety violation that results in disciplinary action, suspension, or discharge.

*NOTE:* A lockout log may be used to assist in the lockout/tag out procedure (Exhibit E).

## DEFINITIONS

**AFFECTED EMPLOYEE:** An employee whose job requires operation or use of a machine or equipment on which servicing or maintenance is being performed under lockout and/or tag out, or whose job requires working in an area in which such servicing or maintenance is being performed.

**AUTHORIZED EMPLOYEE:** A person who locks out and tags or implements a tag out system procedure on machines or equipment to perform the service or maintenance on that machine or

equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on a machine or equipment which shall be locked/tagged out.

**AUTHORIZED AND DESIGNATED LOCKOUT-TAGOUT COORDINATOR:** A person authorized and designated by the project manager/project superintendent that will be responsible for making contact with the owner's authorized representative to locate all systems to be locked/tagged out, and then assist other authorized employees to locate all lockout/tag out systems (valves, switches, etc.).

**CAPABLE OF BEING LOCKED OUT:** An energy isolating device will be considered to be capable of being locked out either if it is designed with a hasp or other attachment or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

**ENERGY ISOLATING DEVICE:** A mechanical device that physically prevents the transmission or release of energy, including, but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.

**ENERGY SOURCE:** Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

**LOCKOUT:** The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

**LOCK BOX:** A box so designed which allows each employee to place his/her personal lock on the box containing keys to locks on equipment being repaired. This is usually used for a group lockout.

**LOCKOUT DEVICE:** A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

**SERVICING AND/OR MAINTENANCE:** Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning, unjamming, adjustments, or tool changes, where the employee may be exposed to the unexpected energization, startup of the equipment, or release of hazardous energy.

**TAGOUT DEVICE:** A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag out device is removed.



**Exhibit B – Tags**





**Exhibit C – Hasps**





# Exhibit D – Lock Removal Form



## Lock Removal Form

My signature on this form is testimony to the fact that, to the best of my ability, I made every attempt to locate the individual to whom this lock belongs.

Date: \_\_\_\_\_ Project No.: \_\_\_\_\_

Name of Project: \_\_\_\_\_

Individual Personally Contacted?	Yes ____ No ____	How? _____
Unable to Contact Individual. What was done?	*Asked fellow workers:	Name: _____ Name: _____
	Telephone call to Employee's home:	Spoke to: _____ (Name)
	*Other Attempts that were made:	Date: _____ Time: _____
		_____
		_____

If contact cannot be made with the individual whose lock has been left in place, a person must be stationed at the point of operation while the superintendent/foreman removes the lock. This person is responsible to keep people away from the area while the lock is being removed.

Signature of person watching point of operation: \_\_\_\_\_

Superintendent/foreman's signature: \_\_\_\_\_

This form must be turned in to your job-site Project Manager. A copy of this form must be kept on file for a period of one year from date of lock removed.

Rev. 06/20/00





## Process Safety Management Program

### Purpose

The objective of Process Safety Management (PSM) of highly hazardous chemicals is to prevent or minimize consequences of catastrophic releases of these chemicals (toxic, reactive, flammable, or explosive) into locations that could expose employees and others to serious hazards. Boldt often performs specialized and potentially hazardous work on or near chemical processes covered by Process Safety Management. These activities include, but are not limited to: confined space entry, new construction, demolition, and maintenance. Process Safety Management is established by various industries (i.e., refineries, waste water treatment plants, paper mills, hospitals, etc.) for the purpose of preventing or minimizing releases which may result in a state of emergency.

In order for Boldt to be in compliance with process safety requirements, there are certain procedures that an owner/client must follow to increase awareness of contract employers. These include:

- Evaluation of a contractor through its safety program, experience modification rate, incident rate, and performance record.
- Information on labeling, hazards, and covered processes (Hazard Communication).
- Explanation of the emergency action plan.
- Development and implementation of safe work practices and operating procedures.
- Maintaining an OSHA 300 Log for contractor's employees, for further evaluation.

### General Requirements

In accordance with each facility's information, Boldt must ensure the following:

- All employees will receive initial training in a newly assigned process, an overview of the process, Hazard Communication, and standard operating procedures needed to perform their job. This training will emphasize the specific safety and health hazards of the process, safe work practices, and emergency operations. Particular attention will be paid to in the potential fire, explosion or toxic release hazards and the applicable provisions of the emergency action plan related to their job. Documentation will support that each individual has the required knowledge, skills, and abilities to carry out the duties of the standard operating procedures.
- Updated training will be provided whenever conditions change or at least annually when working in an area with a covered process. The frequency will be determined by the client in the event of changing or new information.
- Included in the initial training, an emergency action plan will be administered. Employees must be able to recognize and respond to visual and/or audible alarms during a state of emergency and will need to know proper escape routes leading to meeting or "head count" areas.
- Documentation of training will be maintained by the Safety Department, either on-site or at the Corporate Office. Testing will be verbal and/or written type and will be done on the day of training.
- A crucial part of process safety is the owner's ability to trust its contract employees to perform their duties safely.
  - a. An employee must sign in and out of a "covered process" area when working or leaving to insure accountability of a contractor's personnel during an emergency situation. The location of this form and information required will be explained in the initial training session.

- b. Hot Work Permits will be issued for hot work operations conducted on or near a covered process. This will cover all brazing, cutting, grinding, welding, etc. and will be implemented before hot work operations are to begin. The permit will document fire prevention and protection requirements that have been implemented. A completed copy must be kept in the jobsite file.
- c. The Project Manager and/or Superintendent will be responsible for obtaining the written process safety information, including Safety Data Sheets (SDS), prior to conducting any process hazard analysis.
- d. All employees must respect the confidentiality of "trade secret" information when the process safety information is revealed to them.
- e. Employees must immediately report all injuries, incidents and "near misses" to their immediate supervisor, who will notify owner representatives. An incident investigation must be initiated within 24 hours to promptly address the situation and cover any recommendations. Resolutions and corrective actions are to be documented and maintained on file.
- f. Each employee is required to follow Boldt's Safety Policies and Procedures for lockout/tag out, confined space entry, etc. as well as any jobsite-specific procedures such as opening process equipment or piping and controls. Failure to abide by owner requirements, company policies, jobsite safety rules, or specific process safety requirements will subject an employee to Boldt's Disciplinary Program, up to and including termination.
- g. Any and all unique hazards whether created and/or found and identified by Boldt, is to be properly reported to the owner/client.

## **DEFINITIONS**

**CATASTROPHIC RELEASE:** A major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals that present serious danger to employees in the workplace.

**HIGHLY HAZARDOUS CHEMICAL:** A substance possessing toxic, reactive, flammable, or explosive properties.

**HOT WORK:** Work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.

**PROCESS:** Any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of chemicals, or combination of these activities.

**TRADE SECRET:** Any confidential formula, pattern, process, device, information, or compilation of information that is used in employer's business and that gives the employer an opportunity to obtain advantage over competitors who do not know or use it.

## Respirable Crystalline Silica

### Purpose

The purpose of this program is to set out The Boldt Company's approach to minimize workers from exposure to respirable crystalline silica to reduce the risk of possible health complications.

A combination of control measures may be required to achieve this objective. We commit to being diligent in our efforts to select the most effective control methods and technologies available, and to ensure that the best practices, as described in this program, are followed.

These guidelines are designed to be used on projects when the need for an exposure control plan may exist. The initial determination of potential exposure will be made by the project manager and project superintendent with the assistance from the project safety professional.

This program applies to all occupational exposures to respirable crystalline silica in construction work, except where employee exposure will remain below 25 micrograms per cubic meter of air (25  $\mu\text{g}/\text{m}^3$ ) as an 8-hour time-weighted average (TWA) under any foreseeable conditions. See respirable crystalline silica standard OSHA 29 CFR 1926.1153.

### Silica Properties

Silica is the second most common mineral on earth and makes up nearly all of what we call "sand" and "rock." Silica exists in many forms. One of these forms, crystalline silica (including quartz), is the most abundant and poses the greatest concern for human health. Some common materials that contain silica include:

- Rock and sand
- Topsoil and fill
- Concrete, cement, and mortar
- Masonry, brick, and tile
- Granite, sandstone, and slate
- Asphalt (containing rock and stone)
- Fibrous-cement board containing silica

Silica is a component of many common construction materials, and silica-containing dust can be generated during many construction activities, including, but not limited to:

- Abrasive blasting (e.g., of concrete structures)
- Jackhammering, chipping, or drilling rock or concrete
- Cutting brick or tiles
- Sawing or grinding concrete
- Tuck point grinding
- Road construction
- Loading, hauling, and dumping gravel
- Demolition of structures containing concrete
- Sweeping concrete dust

Unprotected employees performing these activities, or working in the vicinity, can be exposed to airborne silica.

## Routes of Entry

- Inhalation of dust containing silica.
- Ingestion while eating, drinking, or using tobacco products. The use of tobacco products alone severely limits the lungs from protecting themselves, and when this is coupled with inhalation of dust containing silica, the resulting damage to the lungs is greatly increased.

## Specified Exposure Control Methods.

For each employee engaged in a task identified on Table 1 (below), the exposing employer shall fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task on Table 1, unless the exposing employer assesses and limits the exposure of the employee to respirable crystalline silica in accordance with this program. A critical component of this program is strict adherence to it by all employees that may be exposed to crystalline silica.

**Table 1**

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None
(iv) Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	None
	-When used indoors or in an enclosed area	APF 10	APF 10
(v) Drivable saws	For tasks performed outdoors only:		
	Use saw equipped with integrated water delivery system that continuously feeds water to the blade.	None	None

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
(vi) Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowl with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector.	None	None
	OR Operate from within an enclosed cab and use water for dust suppression on drill bit.	None	None
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system.		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:		

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
		-When used outdoors	None
-When used indoors or in an enclosed area	APF 10	APF 10	
(xi) Handheld grinders for mortar removal ( <i>i.e.</i> , tuck-pointing)	Use grinder equipped with commercially available shroud and dust collection system.	APF 10	APF 25
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.		
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	OR		
	Use grinder equipped with commercially available shroud and dust collection system.		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism:		
	-When used outdoors	None	None
-When used indoors or in an enclosed area	None	APF 10	
(xiii) Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface.	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	OR		
	Use machine equipped with dust collection system recommended by the manufacturer.	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.		



Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
	When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.		
(xiv) Small drivable milling machines (less than half- lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant.	None	None
	Operate and maintain machine to minimize dust emissions.		
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.	None	None
	Operate and maintain machine to minimize dust emissions.		
	For cuts of four inches in depth or less on any substrate:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.	None	None
	Operate and maintain machine to minimize dust emissions.		
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant.	None	None
(xvi) Crushing machines	Operate and maintain machine to minimize dust emissions.		
	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points).	None	None
	Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions.		
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.		
	Operate equipment from within an enclosed cab.	None	None
	When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
	OR When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None

When implementing the control measures specified in Table 1, the exposing employer shall:

- For tasks performed indoors or in enclosed areas, provide a means of exhaust, as needed, to minimize the accumulation of visible airborne dust;
- For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;
- For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:
  - Is maintained as free as practicable from settled dust;
  - Has door seals and closing mechanisms that work properly;
  - Has gaskets and seals that are in good condition and working properly;
  - Is under positive pressure maintained through continuous delivery of fresh air;
  - Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (e.g., MERV-16 or better); and
  - Has heating and cooling capabilities.

Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

*Alternative exposure control methods.* For tasks not listed in Table 1, or where the exposing employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:

- *Permissible exposure limit (PEL).* The exposing employer shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50 µg/m<sup>3</sup>, calculated as an 8-hour TWA.
- *Exposure assessment-*
  - *General.* The exposing employer shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level in accordance with either the performance option or the scheduled monitoring option of this program.
  - *Performance option.* The exposing employer shall assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.
  - *Scheduled monitoring option.*
    - The exposing employer shall perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification,

in each work area. Where several employees perform the same tasks on the same shift and in the same work area, the exposing employer may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, the exposing employer shall sample the employee(s) who are expected to have the highest exposure to respirable crystalline silica.

- If initial monitoring indicates that employee exposures are below the action level, the exposing employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.
  - Where the most recent exposure monitoring indicates that employee exposures are at or above the action level but at or below the PEL, the exposing employer shall repeat such monitoring within six months of the most recent monitoring.
  - Where the most recent exposure monitoring indicates that employee exposures are above the PEL, the exposing employer shall repeat such monitoring within three months of the most recent monitoring.
  - Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, the exposing employer shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the action level, at which time the exposing employer may discontinue monitoring for those employees whose exposures are represented by such monitoring, except as otherwise provided in the reassessment of exposures section of this program.
- *Reassessment of exposures.* The exposing employer shall reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or when the exposing employer has any reason to believe that new or additional exposures at or above the action level have occurred.
  - *Methods of sample analysis.* The exposing employer shall ensure that all samples taken to satisfy the monitoring requirements of this program are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures in OSHA 29 CFR 1926.1153 Appendix A.
  - *Employee notification of assessment results.*
    - Within five working days after completing an exposure assessment, the exposing employer shall individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees.
    - Whenever an exposure assessment indicates that employee exposure is above the PEL, the exposing employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.
  - *Observation of monitoring.*
    - Where air monitoring is performed to comply with the requirements of this program, the exposing employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to respirable crystalline silica.
    - When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, the exposing employer shall provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.
  - *Methods of compliance.*
    - *Engineering and work practice controls.* The exposing employer shall use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline

silica to or below the PEL, unless the exposing employer can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the exposing employer shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection that complies with the requirements of this program.

- *Abrasive blasting.* The exposing employer shall comply with other OSHA standards, when applicable, such as OSHA 29 CFR 1926.57 (Ventilation), where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

## **Respiratory Protection**

- *General.* Where respiratory protection is required by this program, the exposing employer must provide each employee an appropriate respirator that complies with the requirements of Boldt's Respiratory Protection Program. Respiratory protection is required:
  - Where specified by Table 1 of this program; or
  - For tasks not listed in Table 1, or where the exposing employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:
    - Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
    - Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and
    - During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.
- *Respiratory protection program.* Where respirator use is required by this program, the exposing employer shall institute a respiratory protection program in accordance with OSHA 29 CFR 1926.103 (references 1910.134) respiratory protection standards.
- *Specified exposure control methods.* For the tasks listed in Table 1 of this program, if the exposing employer fully and properly implements the engineering controls, work practices, and respiratory protection described in Table 1, the exposing employer shall be considered to be in compliance with regard to exposure to respirable crystalline silica.

## **Housekeeping**

- The exposing employer shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.
- The exposing employer shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:
  - The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
  - No alternative method is feasible.

## **Written Exposure Control Plan**

- The exposing employer shall establish and implement a written exposure control plan that contains at least the following elements:
  - A description of the tasks in the workplace that involve exposure to respirable crystalline silica;

- A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task;
- A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica; and
- A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employers or sole proprietors.
- The exposing employer shall review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary.
- The exposing employer shall make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this program, their designated representatives, the controlling contractor and any other company that may have personnel exposed to the exposing contractor's work activities.
- The exposing employer shall designate a competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan.
- See Attachment A (located at the end of this program) for the Site Specific Respirable Crystalline Silica Exposure Control Plan

### **Communication of Respirable Crystalline Silica Hazards to Employees**

- *Hazard communication.* The exposing employer shall ensure that each employee has access to labels on containers of crystalline silica and safety data sheets, and is trained in accordance with the provisions of this program. The exposing employer shall ensure that at least the following hazards are addressed: cancer, lung effects, immune system effects, and kidney effects.
- *Employee information and training.*
  - The exposing employer shall ensure that each employee covered by this program can demonstrate knowledge and understanding of at least the following:
    - The health hazards associated with exposure to respirable crystalline silica;
    - Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
    - Specific measures the exposing employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
    - The contents of this program;
    - The identity of the competent person designated by the exposing employer in accordance with this program; and
    - The purpose and a description of the medical surveillance program required by this program.
  - The exposing employer shall make a copy of this program readily available without cost to each employee covered by this program.
  - Note: if any employee notes a condition, circumstance or item of equipment that does not comply with this program, that situation must be reported immediately to the employee's supervisor or the project safety professional and the non-compliant activity stopped immediately until it can be performed in compliance with this program.

### **Medical Surveillance**

- *General*
  - The exposing employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be required under this program to use a respirator for 30 or more days per year.

- The exposing employer shall ensure that all medical examinations and procedures required by this program are performed by a physician or other licensed health care professional (PLHCP) as defined by this program.
- *Initial examination.* The exposing employer shall make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this program within the last three years. The examination shall consist of:
  - A medical and work history, with emphasis on: past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;
  - A physical examination with special emphasis on the respiratory system;
  - A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconiosis by a NIOSH-certified B Reader;
  - A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV<sub>1</sub>) and FEV<sub>1</sub>/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH approved spirometry course;
  - Testing for latent tuberculosis infection; and
  - Any other tests deemed appropriate by the PLHCP.
- *Periodic examinations.* The exposing employer shall make available medical examinations that include the procedures described in this program (unless recommended differently by the PLHCP).
- *Information provided to the PLHCP.* The exposing employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the PLHCP with the following information:
  - A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;
  - The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;
  - A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
  - Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the exposing employer.
- *PLHCP's written medical report for the employee.* The exposing employer shall ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:
  - A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
  - Any recommended limitations on the employee's use of respirators;
  - A statement that the employee should be examined by a specialist if the chest X-ray provided in accordance with this program is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.
- *PLHCP's written medical opinion for the exposing employer.*
  - The exposing employer shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:
    - The date of the examination;
    - A statement that the examination has met the requirements of this program; and
    - Any recommended limitations on the employee's use of respirators.

- If the employee provides written authorization, the written opinion shall also contain either or both of the following:
  - Any recommended limitations on the employee's exposure to respirable crystalline silica;
  - A statement that the employee should be examined by a specialist if the chest X-ray provided in accordance with this program is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.
- The exposing employer shall ensure that each employee receives a copy of the written medical opinion described in this program within 30 days of each medical examination performed.
- *Additional examinations.*
  - If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the exposing employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.
  - The exposing employer shall ensure that the examining specialist is provided with all of the information that the exposing employer is obligated to provide to the PLHCP in accordance with this program.
  - The exposing employer shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination.
  - The exposing employer shall obtain a written opinion from the specialist within 30 days of the medical examination.

## **Recordkeeping**

- *Air monitoring data.*
  - The exposing employer shall make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in this program.
  - This record shall include at least the following information:
    - The date of measurement for each sample taken;
    - The task monitored;
    - Sampling and analytical methods used;
    - Number, duration, and results of samples taken;
    - Identity of the laboratory that performed the analysis;
    - Type of personal protective equipment, such as respirators, worn by the employees monitored; and
    - Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.
  - The exposing employer shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.
- *Objective data.*
  - The exposing employer shall make and maintain an accurate record of all objective data relied upon to comply with the requirements of this program.
  - This record shall include at least the following information:
    - The crystalline silica-containing material in question;
    - The source of the objective data;
    - The testing protocol and results of testing;
    - A description of the process, task, or activity on which the objective data were based; and
    - Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.
  - The exposing employer shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

- *Medical surveillance.*
  - The exposing employer shall make and maintain an accurate record for each employee covered by medical surveillance under this program.
  - The record shall include the following information about the employee:
    - Name and social security number;
    - A copy of the PLHCPs' and specialists' written medical opinions; and
    - A copy of the information provided to the PLHCPs and specialists.
  - The exposing employer shall ensure that medical records are maintained and made available in accordance with OSHA 29 CFR 1910.1020.



## DEFINITIONS

Action level: A concentration of airborne respirable crystalline silica of 25 µg/m<sup>3</sup>, calculated as an 8-hour TWA.

Assistant Secretary: The Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Director: The Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Exposing Employer: An employer or contractor whose own employees are, or could potentially be, exposed to a hazard.

Competent person: An individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge and ability necessary to fulfill the responsibilities set forth in this program.

Employee exposure: The exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.

High-efficiency particulate air [HEPA] filter: A filter that is at least 99.97 percent efficient in removing monodispersed particles of 0.3 micrometers in diameter.

Objective data: Information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in The exposing employer's current operations.

Physician or other licensed health care professional [PLHCP]: An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by this program.

Respirable crystalline silica: Quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle size- selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality-Particle Size Fraction Definitions for Health-Related Sampling.

Specialist: an American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.



**Task Description and Selected Controls:**

- Input each task that may produce respirable crystalline silica into the table below. Briefly describe each task, task duration, location: indoor/outdoor, engineering control, if a respirator is required, and any other notes. This information shall be determined based on Boldt's Silica Task Guide. Contact the Safety Department for further assistance.
- If the task you are performing is not provided in the Boldt Silica Task Guide, contact the Boldt Safety Department to conduct air sampling for this task. Add the task to the table below and determine controls to be used. Respirators will be required for tasks which Boldt does not have past data and OSHA does not provide in their Table 1 (29 CFR 1926.1153).

#	Task Description	Location		Duration		Engineering Controls		Respirator Required?	If Yes, Indicate Respirator Type:
		Indoor	Out-door	<4 hrs.	>4 hrs.	Wet Method	Dust Collection		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Filtering Facepiece (Dust Mask) <input type="checkbox"/> Half Mask Respirator <input type="checkbox"/> Full Face Respirator <input type="checkbox"/> PAPR
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Filtering Facepiece (Dust Mask) <input type="checkbox"/> Half Mask Respirator <input type="checkbox"/> Full Face Respirator <input type="checkbox"/> PAPR
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Filtering Facepiece (Dust Mask) <input type="checkbox"/> Half Mask Respirator <input type="checkbox"/> Full Face Respirator <input type="checkbox"/> PAPR
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Filtering Facepiece (Dust Mask) <input type="checkbox"/> Half Mask Respirator <input type="checkbox"/> Full Face Respirator <input type="checkbox"/> PAPR
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Filtering Facepiece (Dust Mask) <input type="checkbox"/> Half Mask Respirator <input type="checkbox"/> Full Face Respirator <input type="checkbox"/> PAPR
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Filtering Facepiece (Dust Mask) <input type="checkbox"/> Half Mask Respirator <input type="checkbox"/> Full Face Respirator <input type="checkbox"/> PAPR

Notes: (Use # to indicate which task the note relates to)



**Safety Program**

E. Special Programs

Reviewed: January 4, 2019

Effective: September 16, 2005

## **Respiratory Protection Program**

### **GUIDELINES**

This program is designed to help reduce employee exposure to occupational dusts, fogs, smoke, mists, fumes, gases, vapors, or sprays that are harmful to the employee's respiratory system as well as the hazard of oxygen deficiency or enrichment. These conditions may be found, but not limited to: storage tanks, sewers, utility vaults, storage areas, boilers, manholes, pipelines, tank cars, silos, digesters pits, ditches, wells, machinery housings, etc.

The primary objective is to prevent unnecessary exposure to these contaminants.

Where feasible, exposure to contaminants will be eliminated by engineering controls (i.e., general and local ventilation, enclosure or isolation, and substitution of a less hazardous procedure or material). When effective engineering controls are not feasible, the use of personal protective equipment may be required to achieve this goal. Any required equipment, evaluation, or additional information necessary will be provided at no cost to the employee. All documentation associated with the Respiratory Protection Program will be maintained by Boldt's Safety Department.

### **Responsibilities**

**Management:** It is the responsibility of management to determine what specific applications require the use of respiratory equipment. Management will provide proper respiratory equipment to meet the needs of each specific application and provide adequate training and instructions on all equipment.

**Management/Supervisory:** Superintendents, supervisors, foremen, or group leaders of each area are responsible for insuring that all personnel under their control are completely knowledgeable of the respiratory protection requirements for the areas in which they work. They will also be responsible for insuring that their employees comply with all aspects of this respiratory program, including proper medical evaluation, respirator selection, inspection, and maintenance.

Safety representatives are designated and qualified with proper training to know the program and able to conduct evaluations.

**Employees:** It is the responsibility of the employee to have an awareness of the respiratory protection requirements for his/her work areas (as explained by management). Employees are also responsible for wearing the appropriate respiratory equipment according to proper instructions and for maintaining the equipment in a clean and operable condition.

### **Work Area Monitoring**

To assure the adequacy of our Respiratory Protection Program, initial determinations of workplace conditions will be made for all potentially hazardous air contaminant exposures. Additional air contaminant monitoring will be conducted whenever exposures are expected to change (i.e., whenever new raw materials are used or when production process changes). Monitoring will be done on a periodic basis to provide for a continuing healthy environment for employees. Personal sampling equipment may be used in accordance with accepted industrial hygiene standards to sample each work area.

## **Exposure Determination And Measurement**

When the initial exposure determination indicates that any employee may be exposed in excess of the action level, Boldt will measure the exposure of the employee most likely to have the highest exposure. This will be done after appropriate precautions have been taken to protect that individual. If the results indicate that the employee is exposed to concentrations in excess of the action level, Boldt will measure the exposures of all employees similarly affected.

If measurements show that an employee is exposed to concentrations above the permissible limit, the exposure must be monitored continuously and measures taken to reduce or eliminate the exposure.

## **Medical Questionnaire/Evaluation**

In accordance with the Occupational Safety and Health Act, it is required that a physician or licensed health care professional (PLHCP) must determine what health and physical conditions are pertinent when using negative/positive pressure respirators. A Medical Questionnaire (Exhibit A or approved online service is to be completed by the employee (and taken to a physician or PLHCP for evaluation when applicable) prior to fit testing and using a negative/positive pressure respirator. The medical evaluation and its results must be confidential, convenient, understandable, and conducted during normal work hours. The employee will also have an opportunity to discuss the results with the PLHCP.

All employees expected to use negative/positive pressure respirators must fill out the medical questionnaire as accurately as possible.

- This must be completed during normal working hours and kept strictly confidential.
- The PLHCP will evaluate the information from the questionnaire as well as the information given from the Medical Information for Respirator Use form (Exhibit B) which was filled out by an employer representative.
- From that information, the PLHCP will determine the condition of the employee and the status regarding respirator use.
- This form will be completed/returned to the job-site stating the findings and recommendations of the PLHCP. A copy must also be submitted to the Corporate Office.

Additional medical evaluations are required if:

- An employee reports symptom related to the ability to use a respirator.
- A PLCHP or supervisor feels that an employee needs to be reevaluated.
- Observations made during fit-testing or program evaluation indicates the need for reevaluation.
- A change in workplace conditions results in an increased physiological burden to the employee during respirator use.

## **Respirator Selection**

Affected employees who may be exposed to harmful vapors and oxygen deficient atmospheres will be given, at no cost to them, appropriate respirators suitable for their intended purpose. This includes when engineering control measures are not feasible and in emergency situations.

All respirators will be NIOSH (National Institute of Occupational Safety and Health) certified. The selection will be based upon the physical and chemical properties of the air contaminants and the concentration level likely to be encountered by the employee.

After an employee's medical evaluation has been approved, the supervisor will provide a respirator accompanied by fit-testing and training to each employee who is placed as a new hire or as a transferee in a job that requires respiratory protection (Appendix A). Employees must pass a qualitative or quantitative fit test before using each respirator for the first time, and also annually.

Replacement respirators, cartridges, pre-filters, and accessories will be made available as required.

Any questions about the type of equipment to be used or the testing/training should be directed toward the Safety Department.

### **Respirators Used/Approved By Boldt**

- Self-Contained Breathing Apparatus (SCBA)
- Supplied-Air (SA)
- Escape Mouthpiece Type (E)
- Air Purifying Half-Mask or Full face (AP)(PAPR)
- Dust/Mist/Fume Filter Mask (DMF)\*
- Air Purifying (AP)
- Dust/Mist/Fume Mask (DMF)
- Escape Mouth Piece Type (E)
- Self-Contained Breathing Apparatus (SCBA)
- Supplied Air/Airline Respirator With Auxiliary SCBA

\*Although Dust/Mist/Fume Filter Masks are listed above, the use of these products may or may not require a medical evaluation. For further information regarding the use of these, see the section on Voluntary Use of Respirators.

### **Special Considerations When Wearing Respirator Equipment**

Employees wearing tight fitting face pieces must ensure an unbroken seal and anything that can affect the seal such as facial hair or glasses is prohibited.

Facial hair between the wearer's skin and the sealing surface of the respirator that will prevent a good seal is not permitted. This would include beards, sideburns, mustaches, or even a few days' growth of stubble. The lack of a good seal will allow leakage of contaminants into the respirator.

Ordinary eyeglasses cannot be used with full face respirators. Eyeglasses with temple bars or straps that pass between the sealing surface of a full face respirator and the employee's face will prevent a good seal. Again, this lack of a tight seal will allow contaminants to enter the respirator. Eye glasses and goggles may be worn with half face respirators, but must not be allowed to interfere with the seal of the face piece. Any questions regarding corrective eyewear in conjunction with respirators need to be directed to the Safety Department.

Workers cannot, under any circumstances, wear contact lenses when wearing any type of respirator.

Facial deformities, such as scars, deep skin creases, prominent cheekbones, severe acne, and the lack of teeth or dentures, can prevent a respirator from sealing properly. Employees with such conditions may not be assigned tasks requiring the use of respirators.

### **Procedures For Immediately Dangerous To Life Or Health (Idlh) Atmospheres**

One employee or, when needed, additional employees will be located outside the IDLH atmospheres. Visual, voice, or a signal line communication will be maintained between the employees located in the IDLH atmosphere and outside the IDLH atmosphere.

Affected employees involved in this operation are to be trained to perform emergency rescue along with basic first aid and cardio pulmonary resuscitation (CPR). The designated employees are to have the knowledge to utilize rescue equipment such as: body harness, lifeline, tripod, SCBAs, supplied air

respirator with auxiliary air supply, etc.

Prior to an employee entering an IDLH atmosphere, the designated person assigned to monitor this activity is to be notified and provide assistance required to perform the work in a safe manner.

### **Employee Training**

Each employee, upon assignment to an area requiring respirators, must be instructed by the superintendent, supervisor, or foreman as to his/her responsibilities in the respiratory program before using a respirator.

All employees will be required to sign a Respirator Fit-Test and Training

Record (Exhibit C) stating they have been fit-tested and trained in the use, limitations, and proper maintenance of respirators. All forms (Exhibit B and C) are to be forwarded to the Corporate Office where they will be retained with personnel/training files. It is recommended, if possible, that an additional copy be made and kept at the job-site.

### Minimum Training Requirements:

- Purpose of Respirators: If, after effective engineering controls have been fully utilized in reducing exposure to the lowest possible level, the environment is still not completely safe, it will be necessary to protect the worker(s) from contact with airborne contaminants or oxygen-deficient environments.
- Proper use of respirators
- Fitting instructions and sealing tests
- Limitations of respirators
- Proper cleaning procedures
- Respirator inspection
- Respirator maintenance
- Respirator storage
- Emergency procedures
- Medical signs and symptoms
- OSHA requirements

### Retraining:

- Employees will be retrained annually, and if there is reason to believe that an employee lacks the skill or understanding necessary for safe work involving respirators, to maintain the required proficiency.

### **Respiratory Handling Procedures (Non-Disposable Type)**

#### Respirator Cleaning Procedure:

- Respirators must be regularly cleaned and disinfected. Respirators issued to employees must be cleaned each day after use, or more often if necessary.
- Cleaning towelettes (non-alcoholic type) specifically designed for respiratory equipment is the preferred method used to clean and disinfect. If possible, detergents containing a bactericide should be used. Organic solvents are not to be used, as they deteriorate the rubber face piece. If bactericide detergent is not available, the detergent wash should be followed with a disinfecting rinse. One type of disinfectant may be made from readily available household products. A hypochlorite solution (50 parts per million) can be made by adding two tablespoons of chlorine bleach to one gallon of water.
- When respirators cannot be thoroughly cleaned and disinfected by using cleaning towelettes and/or when water is not readily available, respiratory equipment should be washed with detergent in warm water using a brush.

- Respirator equipment must be thoroughly rinsed in clean, warm water (120 degrees Fahrenheit maximum) to remove all traces of detergent cleaner, sanitizer, and disinfectant.
- Respiratory equipment must be allowed to air dry on a clean surface.

#### Respirator Inspection:

- All respirators are to be inspected before and after each use.
- Respirators for emergency use, such as self-contained devices (SCBA), must be inspected monthly.

#### Minimum Inspection Points:

- Tightness of connections
- Condition of face piece
  - Excessive dirt
  - Cracks, tears, holes
  - Distortion
  - Scratched, cracked, or loose-fitting lenses
- Headbands
  - Breaks or tears
  - Loss of elasticity
  - Broken or missing buckles or attachments.
- Valves - Inhalation and Exhalation
  - Detergent residues
  - Dust particles
  - Cracks, tears, or distortion of valve material
  - Missing or defective valve covers
- Filter/Canisters (AP, SA)
  - Proper type for hazard present
  - Missing or worn gaskets
  - Worn or stripped threads
  - Cracks or dents
  - Missing or loose clamps.
- General condition of air hoses (SA, SCBA)
  - Breaks, tears, and kinks
  - End fittings for nicks, dents, gouges, and tightness
- Proper setting of regulators and valves (consult manufacturers recommendations) (SA, SCBA)

#### Defective Equipment:

- If an employee detects break-through or resistance of the cartridge, they must leave the area to wash, and change the cartridges.
- Defective respiratory equipment will be tagged as defective. The tag will include: date, defect, and the name of the employee.
- All defects must be repaired immediately. If an item cannot be repaired it will be immediately removed from service.
- The worksite supervisor will remove all defective respiratory equipment from the worksite as soon as practical, but at least by the end of the shift. Defective items which cannot be repaired will be destroyed.

#### Respirator Maintenance:

- The continued use of respirators may require periodic repair or replacement of component parts. Such repairs and parts replaced must be done in accordance with the manufacturer's specifications.



- When repairs are made on respirators, the repair parts used must be for that specific model of respirator. The interchanging of parts between different models will void the respirator's certification and may cause dangerous air leaks or equipment failure.
- Rubber elastomer parts must be inspected for pliability and signs of deterioration. Stretching and manipulating rubber or elastomer parts with a massaging action will keep them pliable and flexible and prevent them from taking a set during storage.
- A selection of respirator repair parts must be maintained at the worksite for each model of respirator in use or a replacement respirator provided. The replacement parts and/or additional respirators will be kept in a clean area.

#### Storage Procedure:

- When not in use, respiratory equipment must be sealed in a plastic bag and placed in a storage container specifically designed for that purpose.
- Respirators need to be stored in such a way as to not apply pressure to the face piece.
- Respirators must be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, or any other form of contamination.

#### **Voluntary Use Of Respirators**

During certain applications, employees may voluntarily request the use of respirators or may request the use of their own respirator. If supervision deems voluntary use permissible, supervision must determine that the respirator in question will not create a hazard in itself. If this practice is allowed, employees are to be provided the "Information for Employees Using Respirators When Not Required under the Standard" form (Appendix B).

If a person is allowed to voluntarily use a respirator, supervision must implement those elements of the program to ensure the employee is medically able to use that respirator. This would also include proper cleaning, storing, and maintaining the respirator so that it doesn't pose a hazard to the employee. The only exception to this would be the voluntary use of filtering face pieces (dust masks). The use of dust masks/respirators may need clarification. Make sure to read the following two points.

- When using a filtering face piece (dust mask) properly, it may be considered voluntary use according to the OSHA standard because the dust mask is used for expected concentrations below the permissible exposure limit (PEL) and for durations which would not create an exposure. Therefore, employees using filtering face pieces (dust masks) in these circumstances need to be given a copy of "Information for Employees Using Respirators When Not Required under the Standard" (Appendix B). Employees also need to be trained on the use of these as well as limitations and proper disposal of them.
- If the contaminate is at an expected concentration above the permissible limit, or the particular filtering face piece (dust mask) is not rated for the protection necessary, OSHA would require the use of respiratory protection such as an air-purifying half mask or full face respirator. If the exposure is below the permissible limit and an exposure is at an expected duration more frequent than random, and an employee requests or voluntarily wants to wear a respirator (including filtering face pieces [dust masks]), then this would be regulated under the standard and all requirements would apply (medical evaluation and fit-test/training).

#### **Program Evaluation**

The Safety Department will conduct periodic audits to ensure that provisions of the Respiratory Protection Program are being implemented and continue to be effective.

Members of the Safety Department are to consult with employees required to use respirators and assess the employees' views on program effectiveness and identify any problems. Any problems that are identified are to be corrected. These would include, but not limited to: respirator fit, selection,

proper use, and maintenance.

It is the responsibility of Boldt employees to carry out the provisions of this program in their various job functions.

### **Appendix (A)**

Proper respirator use, fitting, sealing, limitations, and definitions related to different types of respirators used by Boldt.

TYPE: Self-Contained Breathing Apparatus (SCBA):

Self-Contained Breathing Apparatus may be required in specific areas for emergency use. This equipment will be used only by trained personnel when it is necessary to enter hazardous atmospheres. The following points must be observed:

- All potential users will be fully trained in the use/limitations of this equipment. For training requirements contact the Safety Department.
- The equipment is to be tested/inspected in an uncontaminated atmosphere prior to entering the hazardous area.
- An employee will not work with this apparatus in a hazardous atmosphere on an individual basis. At least one additional employee suitably equipped with a similar breathing apparatus and/or a system which provides at least the same or higher protection must be in contact with the first employee and must be available to render assistance if necessary. Refer to the special program on confined space entry before work begins.
- This equipment will be inspected monthly and after each use by trained personnel.

TYPE: Supplied Air Full Face Respirator (SA):

Supplied Air Respirators are better known as air-line respirators. They are designed for use in hazardous environments where the concentration of the contaminant exceeds the limitations of air purifying respirators or in environments which are oxygen deficient. This equipment will only be used by trained personnel. The following points must be observed:

- All potential users will be fully trained in the use/limitations of this equipment. For training requirements contact the Safety Department.
- The equipment is to be tested/inspected in an uncontaminated atmosphere prior to entering the hazardous area.
- An employee will not work with this apparatus in a hazardous atmosphere on an individual basis. At least one additional employee suitably equipped with a similar breathing apparatus and/or a system which provides at least the same or higher protection (i.e., SCBA) must be in contact with the first employee and must be available to render assistance if necessary. Refer to the special program on confined space entry before work begins.
- This equipment will be inspected monthly and after each use by trained personnel.

*NOTE:* Regarding SA and SCBA, air must be Grade D or better. When utilized with a compressor, it must be located in a clean atmosphere with in-line purification. This must be tagged to indicate the date of installation or change-out. A carbon monoxide monitor must be incorporated in the system. An alarm will sound when levels exceed 10 PPM. Fittings must not allow connection to non-repairable gases or containers.

TYPE: Escape Mouthpiece Type (E):

USES: Escape chemical cartridge for chlorine, hydrogen chloride, sulfur dioxide, and mists.

- **Fitting Instructions:**
  - Place the neck strap over the head and position it around the neck, thus supporting the respirator in an ever-ready position.
  - Insert the mouthpiece of the respirator into the mouth gripping the two inner lugs with the teeth, and positioning the mouthpiece flange between the teeth and lips.
  - Place the nose clip over the rear of the nostrils to prevent nasal breathing. The spring of the nose clip should be positioned over the bridge of the nose.
  - Cartridge and/or respirator must be sanitized or disposed of after each use.
- **Limitations:**
  - Approved respiratory protection during escape only, from atmosphere containing hydrogen chloride, sulfur dioxide, dusts, and mists having a time weighted average not less than 0.05 milligrams per cubic meter or 2 million particles per cubic foot.
  - NOT FOR USE in atmospheres immediately dangerous to life or health.
  - NOT FOR USE in atmospheres containing less than 19.5 percent oxygen.

TYPE: Air-Purifying Half-Mask or Full Face Respirator (AP):

- **Prior to using, the wearer must examine the respirator to verify:**
  - That the rubber exhalation valve is firmly secured to the exhalation valve seat; the flap and seat are clean and undamaged; and the valve is free to operate.
  - That the proper air-purifying elements are properly inserted and attached to the respirator.
- **Fitting Instructions:**
  - Remove protective eyewear (if worn) when utilizing full face respirator. Loosen the elastic straps. Grasp the front of the face piece with one hand and the upper plastic strap (cradle suspension) with the other hand. Position the respirator on the face so that the inside portion of the face piece (containing the exhalation valve) is under the chin and the narrow portion of the face piece is over the nose.
  - Place the plastic headband straps (cradle suspension) on the head so the top plastic strap rests above the ears on the back of the head. Hook the bottom elastic headband straps behind the neck and below the ears.
  - Adjust the position of the face piece on the face for the best fit and comfort. If the elastic straps are too tight, remove the respirator from the face and loosen the straps. The length of the elastic straps is adjustable. Wiggle the elastic strap through the slot of the headband yoke to lengthen it. Do this on the four slots of the headband yoke as necessary.
  - Adjust the face piece in position on the face for best fit or comfort. Hold the respirator body with one hand. With the other hand, tighten the upper elastic straps on both sides by pulling in an upward direction away from the face piece (tighten just enough so that the respirator is securely in place on the nose).
  - Then tighten the bottom elastic straps on both sides by pulling in the appropriate direction. Tighten enough to secure the respirator under the chin. NOTE: For a comfortable fit, the headband straps must be adjusted equally on both sides of the respirator.
  - To produce a comfortable tight seal, re-adjust the tightness of the upper straps and then the tightness of the bottom straps maintaining equal adjustment on both sides of the respirator.
  - To secure the elastic headband straps in place while wearing the respirator, slide the four (one on each side) small headband slides in an upward direction.
  - Verify the face fit and check the functioning of valves. Before entering a contaminated area, the wearer must obtain a satisfactory face fit in both a positive and negative pressure test as described under seal testing procedures and a respirator fit test.
- **Seal Test: Negative Pressure.**

- Close off the inlet openings to the air-purifying elements by covering them with the palms of the hands or by temporarily sealing them with tape (the tape will be removed at the end of the test). A thin flexible plastic wrap may also be used to cover the air inlets during the test.
- Inhale so that the face piece collapses and hold your breath for about ten seconds.
- Face fit is considered satisfactory if the face piece remains in its slightly collapsed condition for the duration of the test and no inward leakage of air is detected.
- Remove hands, tape, or other temporary covering from air inlets.
- **Seal Test: Positive Pressure.**
  - Close the outlet openings to the exhalation valve by temporarily covering them with hands or by sealing them with tape or with a thin plastic film (i.e., plastic wrap). The sealing material is to be removed at the end of the test.
  - Exhale so that the face piece is slightly distended (enlarged) and hold your breath for about ten seconds.
  - The face piece fit is considered satisfactory if the face piece remains in its slightly distended condition for the duration of the test and no outward leakage of air is detected.
  - Remove hands, tape, or other temporary covering from the exhalation valve cover.
- **Fit Test:**
  - There are different products which may be used to achieve the respirator fit-test. These must be followed according to manufacturer's specifications. Any questions regarding types of products which can be used to achieve proper respirator fit-testing should be directed toward the Safety Department.
- **Replacing Cartridges/Canisters and Filters:**
  - When odor or taste of gases or vapors is present.
  - Eye, nose, or throat irritation is felt.
  - There are different types of cartridges/canisters for different gases, vapors, fumes, etc. The cartridges/canisters used must provide protection for the hazard encountered. The cartridges/canisters are labeled as well as color coded to signify which contaminant(s) they protect against. Cartridges/Canisters must be checked to see if the manufacturer has an end-of-service-life indicator (ESLI) located on it to warn of the end of adequate protection. Any questions/concerns regarding the type of cartridges/canisters to be used or about ESLI needs to be directed toward the Safety Department.
- **Limitations:**
  - NOT FOR USE in atmospheres containing less than 19.5 percent oxygen.
  - NOT FOR USE in atmospheres immediately dangerous to life and health.

TYPE: Dust/Mist/Fume Filter Mask (DMF):

USES: Dust/Mist/Fumes

- **Fitting Instructions:**
  - Thread top elastic strap through top buckles. Repeat for bottom strap and buckles.
  - Place the bottom elastic strap around the head, just below the ears. Untwist the strap.
  - Place the top elastic strap around and above the ears. Untwist the strap.
  - Adjust the tension by pulling the tab of each strap.
  - Using both hands, mold the metal nosepiece to the shape of the nose.
  - Strap tension may be decreased without removing respirator from the head by pushing out on the back of the buckle.
  - The seal of the respirator on the face should be fit-checked prior to wearing.
- **Seal Test:**
  - Cover the front of the respirator with both hands, being careful not to disturb the position of the respirator. Inhale sharply. A negative pressure should be felt inside the respirator. If

any leakage is detected, adjust the position of the respirator and/or tension of straps. Retest the seal as needed. Repeat until the respirator is sealed properly. If you cannot achieve a proper fit, DO NOT ENTER the contaminated area. See your supervisor.

- ***Limitations:***

- Approved for respiratory protection against dusts, fumes, and mists having a time-weighted average not less than 0.05 milligrams per cubic meter or 2 million particles per cubic foot.
- NOT FOR USE in atmospheres containing toxic gases or vapors.
- NOT FOR USE in atmospheres containing less than 19.5 percent oxygen.
- NOT FOR USE in atmospheres immediately dangerous to life and health.

## APPENDIX (B)

### **Information for Employees Using Respirators When Not Required Under the Standard**

(This information must be given to voluntary respirator wearers.)

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following:

- Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
- Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- Keep track of your respirator so that you do not mistakenly use someone else's respirator.

## DEFINITIONS

**ACTION LEVEL:** These are levels of exposure at which OSHA regulations for protective programs must be put into effect.

**AIR PURIFYING RESPIRATOR:** This is probably the most widely used respirator. It is used in areas where there are low level chemical hazards or very low concentrations of contaminants in the air. The air purifying respirator removes contaminants from the air using filters and chemical cartridges/canisters. This respirator must be used in areas where there is enough oxygen in the air to support life. It filters the air; it does not supply breathing air.

**ATMOSPHERE-SUPPLYING RESPIRATOR:** A respirator that supplies the user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators and self-contained breathing apparatus units.

**CANISTER OR CARTRIDGE:** Container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

**DUST:** A solid, mechanically produced particle with a size ranging from submicroscopic to macroscopic.

**END-OF-SERVICE-LIFE INDICATOR (ESLI):** A system that warns the user of the approach of the end of adequate respiratory protection.

ESCAPE-ONLY RESPIRATOR: A respirator intended to be used only for emergency exit.

FILTER OR AIR-PURIFYING ELEMENT: A component used in respirators to remove solids or liquid aerosols from the inspired air.

FILTERING FACEPIECE (DUST MASK): A negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

FIT-TEST: The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

FUME: A solid condensation particulate, usually of a vaporized metal.

GAS: An aeri form fluid that is in a gaseous state at standard temperature and pressure.

HIGH EFFICIENCY PARTICULATE AIR: A filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter (N100, R100, P100).

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH): Any atmosphere that poses an immediate hazard to life or produces immediate, irreversible, debilitating effects on health.

MG/M3: Weight concentration measurement in milligrams of contaminant per cubic meter of air (milligrams per cubic meter).

MIST: A liquid condensation particle.

OSHA TWA: Time-weighted average concentrations that must not be exceeded during any 8-hour work shift of a 40-hour work week as defined by OSHA to be permissible exposure limits (PEL's) as found in OSHA Standards (29CFR 1910.1000) or supplements.

PARTICULATE FILTER SERIES: A letter designation for different types of filters. The types are: N-restricted to atmospheres free of oil aerosols, R-removal of any particle including oil-based liquid aerosol (limited to single shift-8 hours), P-removal of any particle including oil-based liquid aerosols (NIOSH recommends manufacturers establish time-use limitations on these types of respirators).

PERMISSIBLE EXPOSURE LIMIT (PEL): This is the maximum air contaminant concentration a worker can be exposed to on a repeated basis without developing adverse effects.

PHYSICIAN OR OTHER LICENSED HEALTH CARE PROFESSIONAL (PLHCP): An individual whose legally permitted scope of practice (license, registration, certification) allows them to independently provide, or be delegated the responsibility to provide some or all of the health care services necessary.

PPM: A volume concentration measurement in parts of contamination per million parts of air (parts per million).

QUALITATIVE FIT TEST (QLFT): A pass/fail fit test to assess the adequacy of respirator fit that relies on an individual's response to a test agent.

QUANTITATIVE FIT TEST (QNFT): An assessment of the adequacy of respirator fit by numerically

measuring the amount of leakage into the respirator.

RESPIRATORY INLET COVERING: The portion of a respirator that fits the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a face piece, helmet, hood, or a mouthpiece respirator with nose clamp.

SELF-CONTAINED BREATHING APPARATUS: SCBA is used where the air is most hazardous and where the air quality is either unknown or immediately dangerous to life and health. The breathing air source for the SCBA is carried in a tank on the wearer's back. The choice of the SCBA is made because it provides the highest level of protection available. It is often used for the initial entry into an area to determine the extent of the hazard present. Mobility is the major advantage the SCBA has over the air-line respirator. The trade-off is length of work time. SCBA's are rated for either 30 to 60 minutes of air.

SUPPLIED AIR RESPIRATOR: This type of respiratory protection is better known as an air-line respirator. It is designed for use in hazardous environments that have concentrations of contaminants that exceed the limitations of the air purifying respirator or in an oxygen deficient environment. This respirator consists of a face piece that is connected by a hose to a stationary source of breathing air. The breathing air source can be a specially designed compressor which monitors carbon monoxide or a compressed air cylinder. The air supplied must meet strict requirements for purity and quality. The advantages of the supplied air respirator are: 1) it offers a higher level of protection than the air purifying respirator, and 2) the worker can stay in the contaminated area for a longer period of time. The disadvantages are mainly the limited mobility caused by the air-line and the care the wearer must take not to kick or tangle the air-line or allow it to be damaged. The length of the air-line should not exceed 300 feet.

TLV CEILING: (Threshold Limit Value) Concentration that should not be exceeded during any part of the working exposure.

STEL: (Short Term Exposure Limit) a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the actual 8-hour TWA is within the listed TWA limitations. Exposures above the TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times a day. There should be at least 60 minutes between successive exposures in this range.

TWA: (Time Weighted Average) the time-weighted average concentration for a normal 8-hour workday and a 40-hour work week to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

USER SEAL CHECK: An action conducted by the respirator user to determine if the respirator is properly seated with the face.

VAPOR: The gaseous state of a substance that is solid or liquid at temperatures and pressures normally encountered.



# Exhibit A – Respirator Medical Evaluation Questionnaire



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

NOTE: OSHA requires that the following be completed during normal working hours or at a time and place convenient to the employee. To maintain confidentiality, your employer or supervisor must not look at or review these answers, and they must tell you how to deliver or send this questionnaire to the health care professional for review.

CAN YOU READ? (circle one) Yes / No

SEX (circle one): Male / Female

NAME (PRINT): \_\_\_\_\_

DATE: \_\_\_\_\_

JOB TITLE: \_\_\_\_\_

AGE: \_\_\_\_\_

YOUR HEIGHT : \_\_\_\_\_ FT. \_\_\_\_\_ IN.

YOUR WEIGHT: \_\_\_\_\_ LBS.

PHONE # (where you can be reached by the health care professional reviewing this questionnaire): (\_\_\_\_) \_\_\_\_\_

TIME (the best time to phone you at this number): \_\_\_\_\_ AM / PM

Has your employer told you how to contact the health care professional who reviews this questionnaire? Yes / No

Check the type of respirator you will use (you can check more than one category):

\_\_\_\_\_ N, R, P disposable respirator (filter mask, non-cartridge type only).

\_\_\_\_\_ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air self-contained breathing apparatus).

Have you worn a respirator? Yes / No If yes, what type(s): \_\_\_\_\_

### PART A (please circle "Yes" or "No")

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month? Yes / No

2. Have you ever had any of the following conditions?

- a. Seizures (fits): Yes / No
- b. Diabetes (sugar disease): Yes / No
- c. Allergic reactions that interfere with your breathing: Yes / No
- d. Claustrophobia (fear of closed-in places): Yes / No
- e. Trouble smelling odors: Yes / No

3. Have you ever had any of the following pulmonary or lung problems?

- a. Asbestosis: Yes / No
- b. Asthma: Yes / No
- c. Chronic bronchitis: Yes / No
- d. Emphysema: Yes / No
- e. Pneumonia: Yes / No
- f. Tuberculosis: Yes / No
- g. Silicosis: Yes / No
- h. Pneumothorax (collapsed lung): Yes / No
- i. Lung cancer: Yes / No
- j. Broken ribs: Yes / No
- k. Any chest injuries or surgeries: Yes / No
- l. Any other lung problem that you've been told about: Yes / No

Revised: 7/7/05



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

NOTE: OSHA requires that the following be completed during normal working hours or at a time and place convenient to the employee. To maintain confidentiality, your employer or supervisor must not look at or review these answers, and they must tell you how to deliver or send this questionnaire to the health care professional for review.

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
- a. Shortness of breath: Yes / No
  - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes / No
  - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes / No
  - d. Have to stop for breath when walking at your own pace on level ground: Yes / No
  - e. Shortness of breath when washing or dressing yourself: Yes / No
  - f. Shortness of breath that interferes with your job: Yes / No
  - g. Coughing that produces phlegm (thick mucus): Yes / No
  - h. Coughing that wakes you early in the morning: Yes / No
  - i. Coughing that occurs mostly when you are lying down: Yes / No
  - j. Coughing up blood in the last month: Yes / No
  - k. Wheezing: Yes / No
  - l. Wheezing that interferes with your job: Yes / No
  - m. Chest pain when you breathe deeply: Yes / No
  - n. Any other symptoms that you think may be related to lung problems: Yes / No
5. Have you ever had any of the following cardiovascular or heart problems?
- a. Heart attack: Yes / No
  - b. Stroke: Yes / No
  - c. Angina: Yes / No
  - d. Heart failure: Yes / No
  - e. Swelling in your legs or feet (not caused by walking): Yes / No
  - f. Heart arrhythmia (heart beating irregularly): Yes / No
  - g. High blood pressure: Yes / No
  - h. Any other heart problem that you've been told about: Yes / No
6. Have you ever had any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest: Yes / No
  - b. Pain or tightness in your chest during physical activity: Yes / No
  - c. Pain or tightness in your chest that interferes with your job: Yes / No
  - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes / No
  - e. Heartburn or indigestion that is not related to eating: Yes / No
  - f. Any other symptoms related to heart or circulation problems: Yes / No
7. Do you currently take medication for any of the following problems?
- a. Breathing or lung problems: Yes / No
  - b. Heart trouble: Yes / No
  - c. Blood pressure: Yes / No
  - d. Seizures (fits): Yes / No



## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

NOTE: OSHA requires that the following be completed during normal working hours or at a time and place convenient to the employee. To maintain confidentiality, your employer or supervisor must not look at or review these answers, and they must tell you how to deliver or send this questionnaire to the health care professional for review.

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, circle "No" and go to question 9): Yes / No
- a. Eye irritation: Yes / No
  - b. Skin allergies or rashes: Yes / No
  - c. Anxiety: Yes / No
  - d. General weakness or fatigue: Yes / No
  - e. Any other problem that interferes with your use of a respirator: Yes / No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire? Yes / No

**Questions ten through fifteen must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees selected to use other types of respirators, answering these is voluntary.**

10. Have you ever lost vision in either eye (temporarily or permanently)? Yes / No

11. Do you currently have any of the following vision problems?
- a. Wear contact lenses: Yes / No
  - b. Wear glasses: Yes / No
  - c. Color blind: Yes / No
  - d. Any other eye or vision problem: Yes / No

12. Have you had an injury to your ears, including a broken ear drum: Yes / No

13. Do you currently have any of the following hearing problems?
- a. Difficulty hearing: Yes / No
  - b. Wear a hearing aid: Yes / No
  - c. Any other hearing or ear problem: Yes / No

14. Have you ever had a back injury? Yes / No

15. Do you currently have any of the following musculoskeletal problems?
- a. Weakness in any of your arms, hands, legs or feet: Yes / No
  - b. Back pain: Yes / No
  - c. Difficulty fully moving your arms and legs: Yes / No
  - d. Pain or stiffness when you lean forward or backward at the waist: Yes / No
  - e. Difficulty fully moving your head up or down: Yes / No
  - f. Difficulty fully moving your head side to side: Yes / No
  - g. Difficulty bending at the knees: Yes / No
  - h. Difficulty squatting to the ground: Yes / No
  - i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes / No
  - j. Any other muscle or skeletal problem that interferes with using a respirator: Yes / No





## RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE

NOTE: OSHA requires that the following be completed during normal working hours or at a time and place convenient to the employee. To maintain confidentiality, your employer or supervisor must not look at or review these answers, and they must tell you how to deliver or send this questionnaire to the health care professional for review.

### Part B

1. In your present job, are working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen? Yes / No  
  
If yes, do you have feelings of dizziness, shortness of breath, pounding in the chest, or other symptoms when working under these conditions? Yes / No
  
2. At home or work, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (gases, fumes, dusts), or have you come into skin contact with hazardous chemicals? Yes / No  
  
If yes, name the chemicals if you know them: \_\_\_\_\_
  
3. Have you ever worked with any of the materials, or under any of the conditions, listed below?
  - a. Asbestos: Yes / No
  - b. Silica: Yes / No
  - c. Tungsten/cobalt (grinding/welding): Yes / No
  - d. Beryllium: Yes / No
  - e. Aluminum: Yes / No
  - f. Coal (mining): Yes / No
  - g. Iron: Yes / No
  - h. Tin: Yes / No
  - i. Dusty environments: Yes / No
  - j. Any other hazardous exposures: Yes / No  
If "yes," describe the exposures: \_\_\_\_\_
  
4. List any second jobs or side businesses you have: \_\_\_\_\_
  
5. List your current and previous occupations/hobbies: \_\_\_\_\_
  
6. Have you been in the military services? Yes / No  
  
If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes / No
  
7. Have you ever worked on a HAZMAT team? Yes / No
  
8. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier, are you taking any other medications for any reason (including over-the-counter)? Yes / No  
  
If "yes," name the medications if you know them: \_\_\_\_\_
  
9. Describe any special responsibilities or hazardous conditions that you may encounter while using the respirator(s) (if none circle): N/A \_\_\_\_\_
  
10. If you know, provide the toxic substances, as well as the estimated maximum exposure and duration of exposure per shift: \_\_\_\_\_

# Exhibit B – Medical Information for Respirator Use



## MEDICAL INFORMATION FOR RESPIRATOR USE

NOTE: OSHA requires the following information be provided by the employer to the appointed physician or licensed health care professional (PLHCP) prior to medical determination for respirator use.

EMPLOYEE (PRINT): \_\_\_\_\_ SS #: \_\_\_\_\_  
 DATE OF BIRTH: \_\_\_\_\_ PHONE#: \_\_\_\_\_  
 HOME ADDRESS: \_\_\_\_\_  
 ALL HAZARDS REQUIRING RESPIRATOR USAGE (JOB DESCRIPTION): \_\_\_\_\_

(A) <u>TYPE OF RESPIRATOR:</u>		(in kilograms)
{ }	Dust Mask	Respirator Wt. ( 0.03 )
{ }	Escape Mouthpiece Type	Respirator Wt. ( 0.38 )
{ }	Air-Purifying (half-mask with cartridge or canisters)	Respirator Wt. ( 0.44 )
{ }	Air-Purifying (full face with cartridge or canisters)	Respirator Wt. ( 0.62 )
{ }	Powered Air-Purifying	Respirator Wt. ( 3.36 )
{ }	Supplied Air (airline) w/auxiliary SCBA	Respirator Wt. ( 5.42 )
{ }	Self-Contained Breathing Apparatus (SCBA)	Respirator Wt. ( 15.52 )

(B) DURATION AND FREQUENCY THE RESPIRATOR WILL BE WORN:

{ }	Daily Basis	{ }	Approximate hours per day:	_____
{ }	Occasionally, but more than once a week	{ }	Approximate hours per week:	_____
{ }	Occasionally, but less than once a week	{ }	Approximate hours per month:	_____
{ }	Rarely, or for escape use only			
{ }	Rarely, or for emergency rescue only			

(C) EXPECTED PHYSICAL WORK EFFORT WHILE WEARING THE RESPIRATOR:

{ }	Light (eg. inspection, measurement, sitting performing light assembly, standing operating drill press or controlling machines)
{ }	Moderate (eg. installation of small/moderate items at trunk level, standing nailing or filing, assembly work, pushing a wheelbarrow)
{ }	Heavy (eg. installation of large/heavy items from floor to waist or shoulders or while climbing stairs, shoveling, bricklaying or chipping)

(D) OTHER PERSONAL PROTECTIVE EQUIPMENT TO BE WORN WITH THE RESPIRATOR:

{ }	Hearing Protection	{ }	Harnesses/Lifeline	- Wts. _____
{ }	Safety Glasses/Goggles/Face shield	{ }	Special Gloves	- Wts. _____
{ }	Hard Hat /Helmet/Hood	{ }	Special Footwear	- Wts. _____
{ }	Protective clothing (impervious suit-Kappler, Tyvek)			- Wts. _____
{ }	Other (describe): _____			- Wts. _____

(E) EXTREMES OF:

1) Temperature (above 77°F):	Yes / No	if yes then	From _____ °F	To _____ °F
2) Humidity:	Yes / No	if yes then	From _____ %	To _____ %

**MEDICAL DETERMINATION BY PHYSICIAN OR LICENSED HEALTH CARE PROFESSIONAL (PLHCP)**

PLHCP: \_\_\_\_\_ DATE: \_\_\_\_\_

(A) CLASS:

{ }	No restriction on respirator use.	If so, <u>LENGTH OF APPROVAL:</u> _____
{ }	Some specific respirator use restriction as stated below.	
{ }	No respirator use permitted.	
{ }	Medical hold until: _____	Awaiting more data/information. Return date: _____

(B) RESTRICTIONS/LIMITATIONS: \_\_\_\_\_

(C) A WRITTEN COPY OF RECOMMENDATIONS HAS BEEN PROVIDED TO THE EMPLOYEE.

(D) MEDICAL: Facility: \_\_\_\_\_ Phone # \_\_\_\_\_  
 Address: \_\_\_\_\_

I HAVE REVIEWED THE ABOVE INFORMATION AND BELIEVE THIS INFORMATION TO BE ACCURATE.

EMPLOYEE SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

# Exhibit C – Respirator Fit-Test and Training Record



## RESPIRATOR FIT-TEST AND TRAINING RECORD

NOTE: OSHA requires that the following be completed on an annual basis. This must be completed after approval by a physician or licensed health care professional (PLHCP) - obtained from Medical Information for Respirator Use form.

EMPLOYEE (PRINT): \_\_\_\_\_ SS #: \_\_\_\_\_

DATE OF TEST: \_\_\_\_\_ EMPLOYEE #: \_\_\_\_\_

CONDUCTED BY: \_\_\_\_\_ TITLE OF CONDUCTOR: \_\_\_\_\_

MEDICAL DETERMINATION FOR RESPIRATOR USE	
(A)	CLASS:
{ }	No restriction on respirator use. If so, LENGTH OF APPROVAL: _____
{ }	Some specific respirator use restriction as stated below.
{ }	No respirator use permitted.
{ }	Medical hold until: _____ . Awaiting more data/information.
(B)	RESTRICTIONS/LIMITATIONS: _____

JOB DESCRIPTION: \_\_\_\_\_

CONTAMINANT(S): \_\_\_\_\_

(A) TYPE OF RESPIRATOR:

{ }	Dust Mask	{ }	Make: _____
{ }	Escape Mouthpiece Type	{ }	Model: _____
{ }	Air-Purifying (half-mask with cartridge or canister)	{ }	Style: _____
{ }	Air-Purifying (full face with cartridge or canister)	{ }	Size: _____
{ }	Powered Air Purifying	{ }	Other: _____
{ }	Supplied Air (airline) w/auxiliary SCBA		
{ }	Self-Contained Breathing Apparatus (SCBA)		

(B) TYPE OF TEST:

	<u>Qualitative:</u>		<u>Quantitative:</u>
{ }	Saccharin	{ }	Generated Aerosol
{ }	Isoamyl Acetate (Banana Oil)	{ }	Ambient Aerosol
{ }	Irritant Smoke	{ }	Controlled Negative Pressure

(C) LIMITATIONS:

{ }	Beard
{ }	Denture
{ }	Glasses
{ }	Other (explain): _____

(D) MAINTENANCE:

	<u>Cleaning:</u>		<u>Disposal:</u>
{ }	Daily	{ }	Daily
{ }	Weekly	{ }	Weekly
{ }	Monthly	{ }	End of service life
{ }	Other: _____	{ }	Other: _____

(E) FITTING:

{ }	Satisfactory	{ }	Unsatisfactory
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I HAVE BEEN FIT-TESTED AND RECEIVED TRAINING IN THE USE/LIMITATIONS/MAINTENANCE OF THE RESPIRATOR(S) ABOVE.

EMPLOYEE SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

COPY DISTRIBUTION: Original-Safety Department Yellow- Maintain in Jobsite File

Revised: 7/7/05



## Safety Program

E. Special Programs

Reviewed: January 4, 2019

Effective: October 29, 2004

## Safety Incentive Program

Boldt believes that attention to safety is important for the wellbeing of the company and its employees. An efficient and competitive construction company is one that works safely. Employees who work safely are a key ingredient to any successful project.

Good, safe work habits lead to fewer injuries and higher quality work. No one deliberately works in an unsafe manner. However, people do make mistakes, and these mistakes are dangerous and costly for everyone. Giving safety our utmost attention will result in safety-conscious employees.

The Boldt Company has always maintained a strong commitment to construction safety. To illustrate the importance of working safely, Boldt has initiated a Safety Incentive Program. The program is designed to motivate employees to give serious thought and consideration to safety prior to performing their work duties. This program rewards all individuals who participate in the CSI/Near Miss Program.

### Continuous Safety Improvement (CSI)

The Continuous Safety Improvement (CSI) system contributes to strong worker participation by encouraging all employees to be actively involved in the safety process.

**CSI cards** – Filled out each time a near miss (an event that didn't result in injury or damage but had the potential to do so) or safety concern is identified and corrected on a job site. The information on the cards is brought to the attention of field personnel at the job sites. The data is used to identify trends and training initiatives, which are then communicated companywide to mitigate future hazards.

**“Boldt Bucks”** –This incentive program rewards individuals for identifying and correcting hazards and reporting them through our CSI cards. For their participation in the safety program, employees are awarded “Boldt Bucks.”

### Eligibility:

1. All Boldt personnel are eligible
2. “Boldt Bucks” will be issued to employees who participate in the CSI/Near Miss Program by recording any and all CSI/Near Miss incidents.
3. Accumulated Boldt Bucks will be printed weekly on the payroll checks.
4. Submitted CSI cards ~ 10 Boldt Bucks

Access to the “Boldt Company Store” catalog may be obtained by the following link:

<http://www.boldtsafetyincentive.com>

This link will allow individuals to access the catalog and submit an order from any computer with internet access.

Please feel free to contact a member of the Safety Department with any questions you may have about the awards. The company reserves the right to discontinue or modify this program.





## Safety Program

### E. Special Programs

Reviewed: January 4, 2019

Effective: October 29, 2001

## Substance Abuse Program

### Purpose

Boldt has a vital interest in maintaining safe, healthful, and efficient working conditions for its employees, its customers, and the public. Boldt recognizes that substance abuse ranks as one of the major problems working against these interests. It is the intent of this policy to assure the safety of our operations and to protect company assets such as the well-being of our employees and the public in the communities in which we operate.

### Policy

The use, abuse, or possession of intoxicants including, but not limited to, alcohol, controlled substances, illegal drugs, mind altering chemicals, depressants, stimulants, or contraband that could affect an employee's fitness for duty or the safety of those affected by our services on premises is prohibited. The definition of "on premises" could include any work location, vehicle, property, or office which is serviced or used by the company or any client of the company, which could include company owned, rented, or leased vehicles on the property of the company or of any client of the company and/or vehicles of visitors, leased, part-time, or contract personnel on these premises. Any violation of this policy would result in discipline which could include immediate termination of employment.

Employees with unacceptable test results will not be allowed to work at the worksite or facility.

### Drug And Alcohol Testing Requirements

As required on the designated project each employee is subject to the following drug and/or alcohol testing, via quick result or standard protocol.

#### Pre-employment Screening:

- As a condition of employment all employees must agree to voluntarily submit a urine and/or blood specimen for a controlled substance screening test. Job applicants who test positive on a pre-employment drug test may reapply for employment after thirty (30) calendar days, provided they furnish proof of successfully participating in and continuing until completion at an approved drug rehabilitation program, and submit to and pass another pre-employment drug test at a Substance Abuse and Mental Health Services Administration (SAMHSA) certified laboratory at the applicant's own expense. (Exception: MN, IA & OK)

#### Random Test:

- The company will conduct a number of random tests each calendar year that meets or exceeds 25 percent of covered employees. The company will use a third-party administrator to manage all aspects of the random testing program, and selection of employees will be made by using a computer-based, scientifically valid method (e.g., random number generator or equivalent random selection method) that is matched with an employee's social security number or employee ID number. All covered employees will have an equal chance of being selected for testing.
- Random testing will occur on a periodic basis, not more than a monthly basis. Prior to selection,



the Human Resources Department will ensure that the random testing pool has been updated to include all current covered employees. The number of tests to be conducted will be based on the number of covered employees at the beginning of each quarter's test cycle and sufficient to meet the minimum number of required tests. Covered employees will remain in the random selection pool at all times, regardless of whether or not they have been previously selected for testing.

- The selected employee list will be kept in a secure location until the time of testing, at which the list will be provided to the appropriate supervisor, who will, in turn, notify the employee(s) to report for testing. Random testing is unannounced, and employees are notified that they have been selected for testing only after they have reported for duty on the day of collection.
- Specimen collection will be conducted on different days of the week throughout each test cycle to prevent employees from matching their drug-use patterns to the schedule for collection. Random drug tests are normally unobserved by the collector. However, provisions will be available at the collection site for a directly observed collection to take place should circumstances require such action. Once notified by the appropriate Company official, employees will be instructed to report immediately to the collection site.

**Reasonable Suspicion Test:**

- Urine and/or blood drug screening tests and/or a breath/blood alcohol test may be requested by the company of anyone on company property, if probable cause is established by an immediate supervisor or company official.

**Incident Related Test:**

- Company personnel who are involved in an on-the-job incident or near miss incident may be requested to submit to urine and/or blood drug screening tests and/or a breath/blood alcohol test, to eliminate the suspicion of possible violation or suspected use of prohibited substances.

**Post Rehabilitation Test:**

- As part of an employee's rehabilitation program and as a condition of returning to work, an employee may be subject to increased, unannounced follow-up testing.
- The following is a list of the drug classes that may be screened as well as their associated detection levels:

<b>COMPOUND</b>	<b>SCREENING LIMIT</b>	<b>CONFIRMATION LIMIT</b>
Amphetamines	1000 NG/ML	500 NG/ML
Barbiturates	200 NG/ML	200 NG/ML
Benzodiazepines	200 NG/ML	100 NG/ML
Cocaine Metabolites	300 NG/ML	150 NG/ML
Ethanol (Alcohol)	0.04 G/DL	0.04 G/DL
Marijuana (THC)	50 NG/ML	15 NG/ML
Methadone	300 NG/ML	300 NG/ML
Methaqualone	300 NG/ML	200 NG/ML
Opiates	2000 NG/ML	2000 NG/ML
Phencyclidine (PCP)	25 NG/ML	25 NG/ML
Propoxyphene	300 NG/ML	200 NG/ML

\*Ethanol (Alcohol) will only be screened for a reasonable suspicion and incident-related test(s).

- Employees and others covered by this policy are allowed to maintain, on company premises, their own prescription drugs and "over-the-counter" medications provided:
  - They inform their supervisor if the medication may affect their job performance. It may be necessary to consult with the medical practitioner to determine if the medication would restrict the employee's ability to perform his/her normal work activity, or pose a hazard to other employees.
  - Each vial or container contains only one type of pill as specified on the label.
  - Employees cannot possess medication in excess of the amounts designated by the prescriptions, nor consume more than the therapeutically prescribed dosages.
  - The employee may be reassigned to other work fitting the restrictions until said prescription has been terminated.
- The use of illicit drugs off company premises is not acceptable because it can affect on-the-job performance, safety, and can adversely affect the company's public image and liability.
- The legal consumption of alcohol off company premises, during non-working hours, that adversely affects an employee's or other employees' job performance and safety, or adversely affects this company's image and liability, is not acceptable. Legal consumption of alcohol prior to reporting for work should be discontinued at least eight (8) hours prior to reporting for work so that the effects of the alcohol will be eliminated. In the rare case where employees are called in for emergency, unplanned work, and they have been drinking alcoholic beverages immediately prior to such a call, such employees should decline to report until the effects of the alcohol have left their system. Such refusal to report will not be viewed as improper, and no punitive action will arise specifically from such a refusal.

### **Testing Procedures**

- Pre-employment Drug Screening: All job applicants will be required to be drug screened no more than 15 working days prior to commencing work on the project. All arrangements will be made by a designated Boldt representative.
- Each applicant will be presented a Substance Abuse: Employee Consent form (Exhibit A) requiring applicants name, social security number, signature, and approval to perform the test. It is required that each applicant verify his/her identity with photo identification, such as a driver's license. Individuals refusing to take the test or test positive will be treated as a non-negative/failed test and refused employment. The return of an adulterated result will also be considered the same as a non-negative/failed test result.
- Incident Related and Reasonable Suspicion Testing: Following an incident, near miss incident or after a determination for reasonable suspicion has been made, the individual(s) involved will be transported to the designated clinics and/or hospital for drug and alcohol testing unless the site has contracted with a mobile testing facility where testing can be provided on-site.

Incidents that require drug and alcohol screening include, but are not limited to: incidents involving the death of a person; bodily injury to a person which requires medical treatment and/or results in an employee worker compensation claim; damage to material/equipment; or any near miss where there could be possible damage to material/equipment or personnel injury.

### **Searches And Inspections**

Designated representatives of the company may conduct searches and inspections to assure compliance with this program. Searches and inspections may include, but not limited to:

- Unannounced inspections of vehicles and its contents entering, leaving, and while on company/owner premises.
- Company owned or controlled property including offices, desks, field areas, buildings, equipment, lockers, and vehicles.

- Personal property brought on company workplace, such as purses, lunch boxes, tool boxes, briefcases, and articles of clothing.

Any employee or individual found in possession of alcohol, control substances or drug paraphernalia will be subject to disciplinary action.

### **Disciplinary Action**

No employee may be "on duty" if the employee uses any non-approved controlled substance(s) or alcohol, or tests positive (non-negative) for the use of a controlled substance or alcohol.

Applicants who refuse to sign the employee consent form and/or refuse to consent to the testing procedure are to be informed that it will be treated as a non-negative test/failed result. Employees who refuse to consent to a personal search or search of personal property, refuse to sign the appropriate testing forms, and/or refuse to submit to the screening/testing procedure will be informed that voluntary compliance is a condition of continuing employment. Employees who continue to refuse to consent are to be treated as a failed test/non-negative result. The return of an adulterated sample will also be considered the same as a non-negative test result.

Within three working days after notice of a failed test/non-negative result on a confirmatory test, the employee or job applicant may submit information to the employer, indicating information given employee or applicant concerning the drug policy or any prescription or over-the-counter drugs he/she may be taking to explain the results. They may also request a confirmatory retest of the ORIGINAL sample at the employee's or job applicant's own expense.

All non-negative test results from an initial screening test will be verified by a confirmatory test. Reinstatement will be considered thirty (30) calendar days after suspension provided the following criteria are met:

- The employee must begin rehabilitative assessment and/or enroll and actively participate in a company recognized treatment program. Treatment must be followed as prescribed. Refusal to do so will result in termination.
- Thirty (30) days after the initial suspension date the individual at his/her own expense must be re-tested. Specimens to be tested must be analyzed by a SAMHSA certified laboratory and conclusively result in a negative screening.

Any employee who is returned to duty during and after rehabilitation and tests non-negative or fails a second time will be terminated. A refusal to consent to testing after rehabilitation will result in termination.

The company reserves the right to inspect or search any person's property or possessions on company/owner premises if there is reasonable cause to ensure a drug free work environment.

Boldt will reasonably accommodate those staff employees who voluntarily enter and participate in a substance abuse rehabilitative program. Salaried employees who voluntarily request assistance in treatment for substance abuse are to be referred to the Vice President of Human Resources. Craft employees represented by a labor agreement who make this request are to be referred to the appropriate labor representative(s) and/or their respective assistance program. All requests for assistance and the obtaining of treatment must be kept strictly confidential.

### **Confidentiality**

All records will be maintained in a secure location with controlled access. The results of the test(s) will be kept in the strictest confidence by the employer. Results of the test(s) will only be provided to appropriate management and union officials. No one else will be provided the results without the

express written consent of the employee; unless required by law. In those instances where any grievance, legal action, or unemployment insurance is commenced or pursued, the results may be provided.

## **DEFINITIONS**

*INCIDENT RELATED TEST:* An alcohol and controlled substance test administered to individual(s) involved in an incident causing injury, near miss incident, or damage to equipment and/or materials.

*ALCOHOL:* Intoxicating beverage, ethyl alcohol, or other low molecular weight alcohol including methyl and isopropyl alcohol.

*ALCOHOL TEST:* Test conducted by a breath or blood to measure the amount of alcohol concentration in a volume of breath or blood.

*CONFIRMATION LIMIT:*

- For alcohol testing, a confirmation limit refers to a second test following a screening test with a result of 0.04 G/DL or greater.
- For controlled substances testing, a confirmation limit means a second analytical procedure to identify the presence of a specific drug or drug metabolite which is independent of the screen test and which used a different technique and chemical principle from that of the screen test in order to ensure reliability and accuracy.

*CONTROLLED SUBSTANCES:* Includes cocaine, marijuana, opiates, amphetamines (including methamphetamine), phencyclidine (PCP), barbiturates, benzodiazepines, methadone, methaqualone, and propoxyphene.

*CONTROLLED SUBSTANCE TEST:* A method for determining the presence of controlled substances in a specified sample using a scientifically reliable method.

*ILLICIT DRUGS:* Any and all illegal drugs, including so called look-alike and designer drugs; legally obtained drugs which are used in a manner other than that prescribed by a physician; and any substance which can affect a person's perceptions or motor functions.

*LEGAL DRUGS:* A prescribed drug or over-the-counter drug which has been legally obtained and is being used for the purpose which it was prescribed or manufactured.

*POST REHABILITATION TEST:* An alcohol and/or controlled substance test administered to an individual who has violated the prohibitions in this policy prior to the person being permitted to return to duty.

*PRE-EMPLOYMENT SCREENING:* Controlled substance test administered to an individual prior to the first time the person performs any work activities at a designated location.

*REASONABLE SUSPICION TEST:* Alcohol and/or controlled substance testing administered to an individual after a supervisor or company official has determined suspicion of alcohol and/or drug use on specific, contemporaneous observations concerning appearance, behavior, speech, or body odors of the employee.

## Exhibit A – Substance Abuse: Employee Consent



### SUBSTANCE ABUSE: EMPLOYEE CONSENT

I hereby consent and agree to give specimens of my urine, blood, breath, or other recognized media at a medical/mobile facility designated by the current drug testing policy and as stipulated within Boldt's Substance Abuse Program. These specimens will be tested to detect the presence of:

Amphetamines, Barbiturates, Benzodiazepines, Cocaine Metabolites, Marijuana (THC), Methadone, Methaqualone, Opiates, Phencyclidine, Propoxyphene and (if required) Ethanol.

In addition to screening/testing at the initial time of employment, random, or upon management's reasonable suspicion of drug or alcohol use during my employment, in the event I am directly involved in a work related incident, I agree and consent to give specimens of my urine, blood, breath, or other recognized media for testing for the presence of (if required) alcohol and the specified drugs listed above.

I authorize release of the test results to my employer and agree to release the testing facility and my employer from liability arising from the conducting of the test.

The results of the test consented to herein will be kept in strictest confidence by the employer. Results will be provided to appropriate management officials. No one else will be provided the results without the express written consent of the employee. Upon request, I will be furnished results of tests performed on my specimen by the testing facility. In those instances where any grievance, legal action or unemployment insurance is commenced or pursued, the results may be provided.

I acknowledge that I have read and understand Boldt's Substance Abuse Program and understand that refusal to submit to the screening test will constitute voluntary withdrawal of my application of employment; if employed, refusal to submit to such testing will result in suspension of employment and that the presence of one or more of those prohibited drugs at or above the defined threshold level will result in suspension of employment. Any refusal to partake or an adulterated result(s) will be considered the same as a non-negative test resulting in suspension of employment.

Upon suspension of employment for the above mentioned, I understand that I may be reinstated if the criteria contained within the Substance Abuse Program has been met.

\_\_\_\_\_  
Witness Name (please print):

\_\_\_\_\_  
Employee Name (please print):

\_\_\_\_\_  
Witness Signature:

\_\_\_\_\_  
Employee Signature:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Employee Social Security # (Last 4 Digits):



## Daily Construction Report

Incident Report (Injuries to Boldt/Subcontractor/Owner Employees, Vehicle/Equipment and/or Property Damage, Near Miss, etc.):

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Item #	Items To Check In The Field	Yes	No	N/A
1	Housekeeping - everything picked up and material stacked neatly? Dumpster(s) and trash containers/barrels available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Is there an operable fire extinguisher(s) on-site (required every 3,000 sq. ft. <b>or</b> travel to an extinguisher is not more than 100 ft.)? Also required at each level near stairs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Are all employees wearing hard hats (including subcontractors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Are all employees wearing safety glasses and/or prescription glasses with ANSI-approved side shields (including subcontractors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Ground Fault Circuit Interrupters (GFCI) utilized for temporary power or available if not already equipped? Color-coding up-to-date on electrical equipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Scaffold(s) have base plates, fully decked, ladder access available, guardrail system in place, and properly tagged?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Are all ladders secured, stepladders properly used (not standing on top 2 steps)? Ladder(s) extending 3ft. above landing(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	Are employees using fall arrest equipment when necessary (harnesses, lanyards, other devices, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Has each employee using powder-actuated tools been properly trained and issued a card?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Are floor openings, holes, elevator shafts, stairs, trenching and excavations properly barricaded/protected? Guardrail systems utilized where necessary?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Excavations properly sloped/benched/shored, etc.? Barricades adequate for the traffic involved (equipment/vehicles, employees, general public, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Are all flammable gases/liquids and compressed gas cylinders properly stored and secured? A fire extinguisher readily available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	Are all tools and equipment in good working condition with all guarding in place?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Is all rigging maintained, inspected and being stored properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Are all maintenance/inspection sheets on Boldt and/or rental equipment filled out and being turned in on a weekly basis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Are safety meetings being held formally each week? New employees received an orientation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other Comments:

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# Quality Form C

## Concrete Prepour Meeting Sheet

QF	
Page No.	1 of 2
Issue Date:	7/28/2009
Revision No.	1
Project Plan:	None
Print Date:	7/28/2009

Written by: Brian Stroik	Approved By: Matt Mc
Date: 08July8	Date: 09July28,

Project Name:	Project Manager:
Job #:	Superintendent:
Meeting Date:	Concrete Mix:

	Yes	No
<b>A) Schedule for slab placement</b>		
1) PM or Superintendent to bring the proposed pour sequence and schedule to the meeting.		
<b>B) Preconstruction Meeting for slab setup / pour one week prior to pour</b>		
Attendees to include: Superintendent, Structureal Eng., Architect, Concrete Foreman, Plumber, Electrician, PM's, QPM, Steel Erector, Structural Form Installers		
<b>Items to discuss:</b>		
1) Do the specifications require ACI certified installer(s) or a minimum experieince level? _____ years experience		
2) Specified concrete floor tolerances = _____ Related Ff & FI numbers = _____ Min. Ff FI _____		
a) Has a meeting with the Flooring Contractors occurred?		
1) Have the Flooring Contractors provided their tolerances (Ff & FI numbers if possible) for:		
VCT: _____, Sheet Vinyl: _____, Ceramic Tile: _____, Carpet: _____, Terrazzo _____, Other _____		
3) Is a mock up required for finish approval?		
4) For Slab on Grade, who has reviewed the soil compaction reports and do they met the specifications?		
5) Curing - what type for which finish floor product? Wet, Water based or Chemical - IF Chemical what Product? _____		
VCT: _____, Sheet Vinyl: _____, Ceramic Tile: _____, Carpet: _____, Terrazzo _____, Other _____		
6) Size and location of pours,		
a) First Pour : _____ sqft, Located at: _____		
b) Second Pour : _____ sqft, Located at: _____		
c) Third Pour : _____ sqft, Located at: _____		
7) What type of reinforcing is being used? _____ Was it specified or has it been approved?		
a) How will the reinforcing be set at the proper elevation? Standees, Bricks, Mucked in,		
8) Is a Vapor Barrier required?		
a) If yes, type of material? _____		
b) How are penetrations and joints being sealed? _____		
9) Mix design, is it appropriate for the weather, (air requirements?) application etc. Provide concerns / comments below		
a) Hot or Cold Weather Precautions? - circle one		
b) Describe Precautions: _____		
10) Delivery of concrete to:		
a) SITE: Are there requirements on truck revolutions? Is Material coming from a Wet or Dry Batch Plant?		
b) PLACEMENT: Buggy Pump Truck Conveyer Truck Other: _____		
11) Type of screed and or initial placement procedure? Striaght edge, Vibra screed, Copper head, Morrison Other		
a) Tools required for placement. Provide on line below.		
11) Type of finish? Level of hard trowel _____, Broom,		
a) Tools required for Finishing concrete. Provide on line below.		
12) During the pour is some one checking elevations continuously and after placement of adjacent areas?		
a) Third Party Inspecting? _____, Has Forms and Steel been verified to be at correct height?		
b) Is an As Built / Profile of the slab being taken? Yes No Who is providing it?		





<b>BOLDT</b>	<b>Quality Form – C</b>	<b>QF</b>	<b>9.3.0.4</b>
		Page No.	1 of 1
<b>Concrete Placement Release-Pour Card</b>		<b>Volume I, Construction</b>	
		Issue Date:	09Jul07
		Revision No.	5
		Project Plan:	None
		Print Date:	6-Dec-07
Written By: Matt McKinney		Approved By: Jeff Johnson	
Date: 15 Apr 05		Date: 15 Apr 05, 09Jul07	
<b>Pour#:</b>	<b>Ticket #:</b>	<b>Date:</b>	
<b>PROJECT</b>		<b>JOB #</b>	
<b>DRAWING #/REV.</b>	<b>ELEVATION/COOR</b>		
<b>LOCATION</b>			
<b>DESCRIPTION</b>			
<b>PRE-PLACEMENT INSPECTIONS</b> <b>VERIFY THE FOLLOWING:</b>	<b>Foreman</b>	<b>Boldt Super.</b>	<b>Comments</b>
* Subgrade compaction			
* Survey; location, elevations, orientation, tolerances			
* Chamfers, cleanliness			
* Forms are properly tied and braced or shored			
Rebar and/or mesh: size, grade, support, position,			
* clearance and development length, dowels, cleanliness			
* Construction joints; preparation and cleanliness of			
keyways and waterstops			
* Embeds; quantity, material, location and size:			
A. Piping			
B. Plumbing			
C. Electrical			
D. Structural			
E. Other			
* Anchor Bolts; alignment, protrusion, elevations			
* Placement area preparation; clean, moist/vapor barrier			
* Availability of adequate placing equipment and			
materials; staging area prepared			
* Provisions for hot/cold weather concreting			
* Provisions for curing (ACI 308)			
<b>PLACEMENT/POST PLACEMENT INSPECTIONS</b>			
* Independent laboratory performs required tests;			
check that results meet design criteria			
* Batch weights on truck tickets are per mix design.			
* Water added by authorized person & recorded			
* Placement within batching and mixing time limits			
* Consolidation, free fall, lateral movement			
* Any additional embeds are properly located			
* Specified finish			
* Ff and F1 strike off requirements followed			
* Implementation of hot/cold weather practices			
* Proper curing practices (ACI 308)			
* Form work; shoring & reshoring removal time			
* Control joint locations			
* Final inspection after form removal.			
<b>RELEASES</b>		<b>SPECIFIED CONCRETE</b>	
Foreman/Date: _____	Concrete Supt./Date: _____	Type concr _____	Mix Design #: _____
Client/Date: _____	_____	Quantity: _____	Design Slump: _____
		Additives: _____	Design PSI: _____
		Additives: _____	Design % air: _____

<b>BOLDT</b>	<b>Quality Form – C</b>	<b>QF</b>	<b>9.3.6.2</b>
		Page No.	1 of 1
<b>Grout Release/Pour Record Cementitious Grout</b>		<b>Volume I, Construction</b>	
		Issue Date:	09Jul07
		Revision No.	1
		Project Plan:	None
		Print Date:	28-Apr-11
Written By: Ron Jochimsen		Approved By: Jeff Johnson	
Date: 01May06		Date: 06Jul06, 09Jul07	
Compliance with project specifications will achieve customer satisfaction and avoid unacceptable work practices. This checklist is not intended to be a substitute for project specifications and procedures. Being familiar in Boldt Quality Work Procedure QWP 9.3.6 will assist in accomplishing the best practices that result in quality construction.			

<b>Pour #</b>	<b>Pour Date:</b>	<b>Pour Time Start:</b>	<b>Pour Time End:</b>
<b>Job #</b>	<b>Project Name:</b>		<b>Project Location:</b>
<b>Machinery/Equipment #</b>		<b>Machinery/Equipment Name:</b>	
<b>Machinery/Equipment Drawing#</b>		<b>Machinery/Equipment Location:</b>	
<b>Non-Shrink Grout Type:</b>	<input type="checkbox"/> CG <input type="checkbox"/> Cementitious	<input type="checkbox"/> C <input type="checkbox"/> Cement & Sand	<input type="checkbox"/> OEM <input type="checkbox"/> Manufacturer supplied
<b>Grout Texture:</b>	<input type="checkbox"/> Plastic	<input type="checkbox"/> Flowable	<input type="checkbox"/> Fluid
		<input type="checkbox"/> Pumped	<input type="checkbox"/> Dry Pack
<b>Grout Manufacturer:</b>	<b>Grout Name:</b>	<b>Grout Catalog #</b>	
<b>Base/Fndtn Temp:</b>	<b>Air Temp:</b>	<b>Grout Temp: place ____ +2hr ____</b>	<b>Grout Lot # (Use back for more #):</b>

<b>General Preparation Requirement</b>	<b>Comments</b>	<b>Foreman</b>	<b>Date</b>
Shop drawings approved for materials & methods			
Planning meeting held & attended by all involved			
72-hour notice of grout placement given			
Tools, equipment & other material onsite & available			
Vendor representative present, if required ( <input type="checkbox"/> NR)			
Hot/cold weather special protection ready ( <input type="checkbox"/> NR)			
Manufacture requirements reviewed & met			
<b>Cementitious Type – Preparation Requirement</b>	<b>Comments</b>	<b>Foreman</b>	<b>Date</b>
Grout & added aggregate stored in dry place.			
Materials within placing temperature before pour, 40°-90°F			
Metal base/plate free of oil/grease/rust/scale			
Concrete foundation rough with no loose material			
Foundation soaked for 24-hr, surface water removed			
Base/plate set, proper clearance for grout texture & travel			
Formwork liquid tight, or rigid for rammed dry pack			
Forms 1” wider & higher than base/plate			
<b>Cementitious Type – Mixing &amp; Placing Requirement</b>	<b>Comments</b>	<b>Foreman</b>	<b>Date</b>
Horizontal shaft mixer used (dry pack can be by hand)			
+3/8” pea gravel over 4” thick, 50% by weight max ( <input type="checkbox"/> NR)			
Grout placed within 45 minutes of mixing			
3+ Test cubes: 1/Lot, 1/5cf/shift, 1/Base. (#Cast = _____)			
After set: remove form; trim edge 45° from base/plate down			
<b>Cementitious Type – Post Placing Requirement</b>	<b>Comments</b>	<b>Foreman</b>	<b>Date</b>
Wet cure exposed edges or apply cure-compound			
Prepared to maintain temperature between 50°-100°F			
Prepared to shield from sun or provide heat ( <input type="checkbox"/> NR)			

Approval, Supt/FE:	Date/Time:
Approval, Quality:	Date/Time:
Approval, Owner or Designated Authority:	Date/Time:
Quality Approval to file:	Date:
Owner Acceptance:	Date:

# CITY OF DULUTH PROJECT LABOR AGREEMENT

## ARTICLE I PURPOSE

This Agreement is entered into as of the date of attestation by the City Clerk, by and between Click or tap here to enter text., its successors or assigns (hereinafter “Project Contractor”), and the City of Duluth, (hereinafter “Owner”<sup>1</sup>) and the Duluth Building and Construction Trade Council, on behalf of its affiliated local unions, acting on their own behalf and on behalf of their respective affiliates and members whose names are subscribed hereto and who have, through their duly authorized officers, executed this Agreement (hereinafter collectively called the “Union or Unions”), with respect to the construction of the Click or tap here to enter text. (hereinafter “Project”).

The term “Contractor” shall include all construction contractors and subcontractors of whatever tier engaged in construction work within the scope of this Agreement, including the Project Contractor when it performs construction work within the scope of this Agreement. Where specific reference to Click or tap here to enter text. alone is intended, the term “Project Contractor” is used.

The parties recognize the need for the timely completion of the Project without interruption or delay. This Agreement is intended to establish a framework for labor-management cooperation and stability. The Contractor(s) and the Unions agree that the timely construction of this Project will require substantial numbers of employees from construction and supporting crafts possessing skills and qualifications that are vital to its completion. They will work together to furnish skilled, efficient craft workers for the construction of the Project.

Further, the parties desire to mutually establish and stabilize wages, hours and working conditions for the craft workers on this construction project, to encourage close cooperation between the Contractor(s) and the Unions to the end that a satisfactory, continuous and harmonious relationship will exist between the parties to this Agreement.

Therefore, in recognition of the special needs of this Project and to maintain a spirit of harmony, labor-management peace, and stability during the term of this Agreement, the parties agree to abide by the terms and conditions in this Agreement, and to establish effective and binding methods for the settlement of all misunderstandings, disputes or grievances which may arise. Further, the Contractor(s) and all contractors of whatever tier, agree not to engage in any lockout, and the Unions agree not to engage in any strike, slow-down, or interruption or other disruption of or interference with the work covered by this Agreement.

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<sup>1</sup> Where the work is performed under Contract with the City of Duluth, the “Owner” is the City of Duluth. Where the Owner receives financial assistance or payment from the City, the Owner is the corporation, firm or other entity that is receiving the assistance or payment.

**ARTICLE II**  
**SCOPE OF AGREEMENT**

Section 1. This Project Labor Agreement shall apply and is limited to all construction work included in all bid categories for the Project under the direction of and performed by the Contractor(s), of whatever tier, which may include the Project Contractor, who have contracts awarded for such work on the Project. Such work shall include site preparation work and dedicated off-site work.

The Project is defined as: [Click or tap here to enter text.](#)

Section 2. It is agreed that the Project Contractor shall require all Contractors of whatever tier who have been awarded contracts for work covered by this Agreement to accept and be bound by the terms and conditions of this Project Labor Agreement by executing the "Agreement to be Bound" form attached as Exhibit 1 prior to commencing work. This Project Labor Agreement is a material term of the bid specifications for the Project and therefore, regardless of whether a contractor executes this Agreement, by virtue of the owner and/or Project Contractor accepting the bid offer of the Contractor, a Contractor who performs work on this project is bound to this PLA regardless of their execution of this Agreement. The Project Contractor shall assure compliance with this Agreement by the Contractors. It is further agreed that, where there is a conflict, the terms and conditions of this Project shall supersede and override terms and conditions of any and all other national, area, or local collective bargaining agreements, except for all work performed under the NTL Articles of Agreement, The National Stack/Chimney Agreement, the National Cooling Tower Agreement, all instrument calibration work and loop checking shall be performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, with the exception of Article V, VI and VII of this Project Labor Agreement, which shall apply to such work. It is understood that this is a self-contained, stand alone, Agreement and that by virtue of having become bound to this Project Agreement, neither the Project Contractor nor the Contractors will be obligated to sign any other local, area or national agreement.

Section 3. Nothing contained herein shall be construed to prohibit, restrict or interfere with the performance of any other operation, work, or function which may occur at the Project site or be associated with the development of the Project.

Section 4. This Agreement shall only be binding on the signatory parties hereto and shall not apply to their parents, affiliates or subsidiaries.

Section 5. The Owner and/or Project Contractor have the absolute right to select any qualified bidder for the award of contracts on this Project without reference to the existence or non-existence of any agreements between such bidder and any party to this Agreement; provided, however, only that such bidder is willing, ready and able to become a party to and comply with this Project Agreement, should it be designated the successful bidder.

Section 6. As areas and systems of the Project are inspected and construction tested by the Project Contractor or Contractors and accepted by the Owner, the Project Labor Agreement will not have further force or effect on such items or areas, except when the Project Contractor or Contractors are

directed by the Owner to engage in repairs, modifications, check-out, and warranty functions required by its contract with the Owner during the term of this Agreement.

Section 7. It is understood that the Owner, at its sole option, may terminate, delay and/or suspend any or all portions of the Project at any time.

Section 8. It is understood that the liability of any employer and the liability of the separate unions under this Agreement shall be several and not joint. The unions agree that this Agreement does not have the effect of creating any joint employer status between or among the Owner, Contractor(s) or any employer.

Section 9. The provisions of this Project Labor Agreement shall apply to all craft employees represented by any Union listed in Schedule A hereto attached and shall not apply to other field personnel or managerial or supervisor employees as defined by the National Labor Relations Act. No Contractor party is required to sign any other agreement as a condition of performing work within the scope of this Agreement. However, any Contractor performing work on the Project which is not party to a Local Area Labor Agreement for a craft employed by the Contractor, agrees to install hourly wage rates, hours, fringe benefit contributions, referral procedures and all other terms and conditions of employment as fully set forth in the applicable Local Area Agreement as described in Schedule A for work on the Project for each craft employed by the Contractor. But in no event shall the wages be less than the wages that are applicable to this project under the Minnesota Prevailing Wage Act, Minn. Stat. § 177.43. All employees covered by this Agreement shall be classified in accordance with the work performed. Nothing in this Agreement requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work.

Section 10. The Contractors agree to timely pay contributions to the established employee benefit funds in the amounts designated in the Local Area Labor Agreements attached as Schedule A.

The Contractors adopt and agree to be bound by the written terms of the legally-established Trust Agreements specifying the detailed basis on which payments are to be made into, and benefits paid out of, such Trust Funds. The Contractors authorize the parties to such Trust Agreements to appoint trustees and successor trustees to administer the Trust funds and hereby ratify and accept the Trustees so appointed as if made by the Contractors.

Section 11. All workers delivering fill, sand, gravel, crushed rock, transit/concrete mix, ready mix, asphalt or other similar material and all workers removing any materials from the construction site shall receive a total package of wages and benefits at least and not lower than the wages and benefits provided for in the then current Highway, Heavy Construction Agreement between Teamsters Local 346 and the Associated General Contractors of America, or the Highway Heavy Prevailing Wage Schedule, whichever is greater.

**ARTICLE III**  
**UNION RECOGNITION AND UNION SECURITY**

Section 1. The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all craft employees within their respective jurisdictions working on the Project within the scope of this Agreement.

Section 2. Authorized representatives of the Union shall have access to the Project, provided they do not interfere with the work of employees and further provided that such representatives comply fully with the posted visitor and security and safety rules of the Project.

**ARTICLE IV**  
**REFERRAL OF EMPLOYEES**

Applicants for the various classifications covered by this Agreement required by the Employer or Contractors on the Project shall be referred to the Contractors by the Unions. The Unions represent that its local unions administer and control their referrals and it is agreed that these referrals will be made in a non-discriminatory manner and in full compliance with Federal and State laws.

**ARTICLE V**  
**MANAGEMENT'S RIGHTS**

The Project Contractor and Contractors of whatever tier retain full and exclusive authority for the management of their operations. Except as otherwise limited by the terms of this Agreement or the applicable local area agreements, the Contractors shall direct their working forces at their prerogative, including, but not limited to hiring, promotion, transfer, lay-off or discharge for just cause.

**ARTICLE VI**  
**WORK STOPPAGES AND LOCKOUTS**

Section 1. During the term of this Agreement there shall be no strikes, picketing, work stoppages, slowdowns or other disruptive activity for any reason by the Unions or by any employee, and there shall be no lockout by the Contractor. Failure of any Union or employee to cross any picket line established at the Project site is a violation of this Article.

Section 2. The Unions shall not sanction, aid or abet, encourage or continue any work stoppage, strike, picketing or other disruptive activity at the Contractor's project site or any site of a contractor or supplier necessary for the performance of work at the project site and shall undertake all reasonable means to prevent or to terminate any such activity. No employee shall engage in activities which violate this Article. Any employee who participates in or encourages any activities which interfere with the normal operation of the Project shall be subject to disciplinary action, including discharge, and if justifiably discharged for the above reasons, shall not be eligible for rehire on the Project for a period of not less than thirty (30) days.

Section 3. The Unions shall not be liable for acts of employees for whom it has no responsibility. The International Union General President or Presidents will immediately instruct, order and use the best efforts of his office to cause the Local Union or Unions to cease any violations of this Article. An International Union complying with this obligation shall not be liable for unauthorized acts of its Local Union. The principal officer or officers of a Local Union will immediately instruct, order and

use the best efforts of his office to cause the employees the Local Union represents to cease any violations of this Article. A Local Union complying with this obligation shall not be liable for unauthorized acts of employees it represents. The failure of the Contractor to exercise its right in any instance shall not be deemed a waiver of its right in any other instance.

Section 4. Any party alleging a breach of this Article shall have the right to petition a court for temporary and permanent injunctive relief. The parties agree that the moving party, upon proving a breach of this Agreement, shall be entitled to temporary and permanent injunctive relief.

**ARTICLE VII**  
**SAFETY**

The parties are mutually committed to promoting a safe working environment for all personnel at the job site. It shall be the responsibility of each employer to which this PLA applies to provide and maintain safe working conditions for its employees, and to comply with all applicable federal, state and local health and safety laws and regulations.

**ARTICLE VIII**  
**UNION-MANAGEMENT COOPERATION COMMITTEE**

The parties to this Agreement agree to form a Union-Management Committee, consisting of signatory unions, contractors, and representatives of the City of Duluth. The purpose of the Committee is to ensure cooperation on matters of mutual concern, including productivity, quality of work, safety and health.

**ARTICLE IX**  
**DISPUTES AND GRIEVANCES**

Section 1. This Agreement is intended to provide close cooperation between management and labor. Each of the Unions will assign a representative to this Project for the purpose of completing the construction of the Project economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

Section 2. The Contractors, Unions, and the employees, collectively and individually realize the importance to all parties to maintain continuous and uninterrupted performance of the work on the Project, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

Section 3. Any question or dispute arising out of and during the term of this Project Labor Agreement (other than trade jurisdictional disputes) shall be considered a grievance and subject to resolution under the following procedures:

Step 1. (a) When an employee subject to the provisions of this Agreement feels he or she is aggrieved by a violation of this Agreement, he or she, through his or her local union business representative or job steward, shall, within ten (10) working days after the occurrence of the violation, or knowledge of the violation, give notice to the work-site representative of the involved Contractor stating the provision(s) of the Local Area Agreement and/or this PLA alleged to have been violated. The



business representative of the local union or the job steward and the work-site representative of the involved Contractor and the Project Contractor shall meet and endeavor to adjust the matter within three (3) working days after timely notice has been given. The representative of the Contractor shall keep the meeting minutes and shall respond to the Union representative in writing (copying the Project Contractor) at the conclusion of the meeting but not later than twenty-four (24) hours thereafter. If they fail to resolve the matter within the prescribed period, the grieving party may, within forty-eight (48) hours thereafter, pursue Step 2 of the Grievance Procedure, provided the grievance is reduced to writing, setting forth the relevant information concerning the alleged grievance, including a short description thereof, the date on which the grievance occurred, and the provision(s) of the Local Area Agreement and/or this PLA alleged to have been violated.

(b) Should the Local Union(s) or the Project Contractor or any Contractor have a dispute with the other party and, if after conferring, a settlement is not reached within seven (7) working days, the dispute may be reduced to writing and proceed to Step 2 in the same manner as outlined herein for the adjustment of an employee complaint.

Step 2. The Business Manager or his or her designee of a Local Union and the involved Contractor shall meet within seven (7) working days of the referral of a dispute to this second step to arrive at a satisfactory settlement thereof. Meeting minutes shall be kept by the Contractor. If the parties fail to reach an agreement, the dispute may be appealed in writing in accordance with the provisions of Step 3 within seven (7) calendar days thereafter.

Step 3. (a) If the grievance has been submitted but not adjusted under Step 2, either party may request in writing, within seven (7) calendar days thereafter, that the grievance be submitted to an Arbitrator mutually agreed upon by them. The Contractor and the involved Union shall attempt mutually to select an arbitrator, but if they are unable to do so, they shall request the Federal Mediation and Conciliation Service to provide them with a list of seven (7) neutral arbitrators from which the Arbitrator shall be selected. The parties shall alternatively strike arbitrators from the list until one remains, who shall preside at the hearing. The party striking first shall be determined by the flip of a coin. The decision of the Arbitrator shall be final and binding on all parties. The fee and expenses of such Arbitration shall be borne equally by the Contractor and the involved Local Union(s).

(b) Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The Arbitrator shall have the authority to make decisions only on issues presented to him or her, and he or she shall not have authority to change, amend, add to or detract from any of the provisions of this Agreement.

Section 4. The Project Contractor and Owner shall be notified of all actions at Steps 2 and 3 and shall, upon their request, be permitted to participate in all proceedings at these steps.

## **ARTICLE X** **JURISDICTIONAL DISPUTES**

Section 1. The assignment of work will be solely the responsibility of the Contractor performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor Plan.

Section 2. All jurisdictional disputes on this Project, between or among Building and Construction Trades Unions and employers, parties to this Agreement, shall be settled and adjusted according to the present Plan established by the Building and Construction Trades Department or any other plan or method of procedure that may be adopted in the future by the Building and Construction Trades Department. Decisions rendered shall be final, binding and conclusive on the Contractors and Unions parties to this Agreement.

Section 3. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

Section 4. Each Contractor will conduct a pre-job conference with the appropriate Building and Construction Trades Council prior to commencing work. The Project Contractor and the Owner will be advised in advance of all such conferences and may participate if they wish.

## **ARTICLE XI** **SUBCONTRACTING**

The Project Contractor agrees that neither it nor any of its contractors or subcontractors will subcontract any work to be done on the Project except to a person, firm or corporation who is or agrees to become party to this Agreement. Any contractor or subcontractor working on the Project shall, as a condition to working on said Project, become signatory to and perform all work under the terms of this Agreement.

## **ARTICLE XII** **HELMETS TO HARDHATS**

Section 1. The Employers and Unions recognize a desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Employers and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the parties.

Section 2. The Unions and Employers agree to coordinate with the Center to create and maintain an integrated database of veterans interested in working on this Project and of apprenticeship and employment opportunities for this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

## **ARTICLE XIII** **LABOR HARMONY CLAUSE**

The contractor shall furnish labor that can work in harmony with all other elements of labor employed on the Project and shall submit a labor harmony plan to demonstrate how this will be done. "Harmony" shall include the provision of labor that will not, either directly or indirectly, cause or

give rise to any work disruptions, slowdowns, picketing, stoppages, or any violence or harm to any person or property while performing any work, or activities incidental thereto at the Project. The labor harmony plan should include the company's labor management policies, collective bargaining agreements if any and their expiration dates, past labor relations history, a listing of activities anticipated under this contract that may potentially cause friction with on-site workers, and procedures the company will undertake to eliminate this friction.

The contractor agrees that it shall require every lower-tier subcontractor to provide labor that will work in harmony with all other elements of labor employed in the work, and will include the provisions contained in the paragraph above, in every lower-tier subcontract let for work under this contract.

The requirement to provide labor that can work in harmony with all other elements of labor employed in the work throughout the contract performance is a material element of this contract. Failure by the contractor or any of its lower-tier subcontractors to comply with this requirement shall be deemed a material breach of the contract which will subject the contractor to all rights and remedies the Owner or Project Contractor may have, including without limitation the right to terminate the contract.

**ARTICLE XIV**  
**NO DISCRIMINATION**

Section 1. The Contractor and Union agree that they will not discriminate against any employee or applicant for employment because of his or her membership or non-membership in a Union or based upon race, color, religion, sexual preference, gender identification, national origin or age in any manner prohibited by law or regulation.

Section 2. Any complaints regarding application of the provisions of Section 1, should be brought to the immediate attention of the involved Contractor for consideration and resolution.

Section 3. The use of the masculine or feminine gender in this Agreement shall be construed as including all gender identification.

**ARTICLE XV**  
**SAVINGS AND SEPARABILITY**

It is not the intention of the parties to violate any laws governing the subject matter of this Agreement. The parties hereto agree that in the event any provisions of the Agreement are finally held or determined to be illegal or void as being in contravention of any applicable law, the remainder of the Agreement shall remain in full force and effect unless the part or parts so found to be void are wholly inseparable from the remaining portions of this Agreement. Further, the Contractor and Union agree that if and when any and all provisions of this Agreement are finally held or determined to be illegal or void by a Court of competent jurisdiction, the parties will promptly enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the requirements of an applicable law and the intent of the parties hereto.

**ARTICLE XVI**  
**DURATION OF THE AGREEMENT**

The Project Labor Agreement shall continue in effect for the duration of the Project construction work described in Article II hereof. Construction of any phase, portion, section or segment of the project shall be deemed complete when such phase, portion, section or segment has been turned over to the Owner and has received the final acceptance from the Owner's representative.

Since there are provisions herein for no strikes or lockouts in the event any changes are negotiated and implemented under a Local Area Agreement during the term of this Agreement, the Contractor agrees that, except as specified herein, such changes shall be recognized and shall apply retroactively to the termination date in the particular Local Agreement involved. Each Contractor which has a Local Agreement with a Union at the time that its contract at the project commences shall continue it in effect with each said Union so long as the Contractor remains on the project. In the event any such Local Area Agreement expires, the Contractor shall abide by all of the terms of the expired Local Agreement until agreement is reached on a new Local Agreement, with any changes being subject to the provisions of this Agreement.

The Union agrees that there will be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity affecting the Project by any Union involved in the negotiation of a Local Area Agreement nor shall there be any lockout on this Project affecting the Union during the course of such negotiations.

*[The remainder of this page intentionally left blank. Signature page to follow].*

TEMPLATE

IN WITNESS WHEREOF, the parties have hereunto set their hands on the date of attestation shown below.

DULUTH BUILDING AND  
CONSTRUCTION TRADES COUNCIL

Click or tap here to enter text.

By: \_\_\_\_\_

By: \_\_\_\_\_

Its: \_\_\_\_\_  
(Printed Name/Title)

Its: \_\_\_\_\_  
(Printed Name/Title)

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Phone No.: \_\_\_\_\_

CITY OF DULUTH

By: \_\_\_\_\_  
Mayor

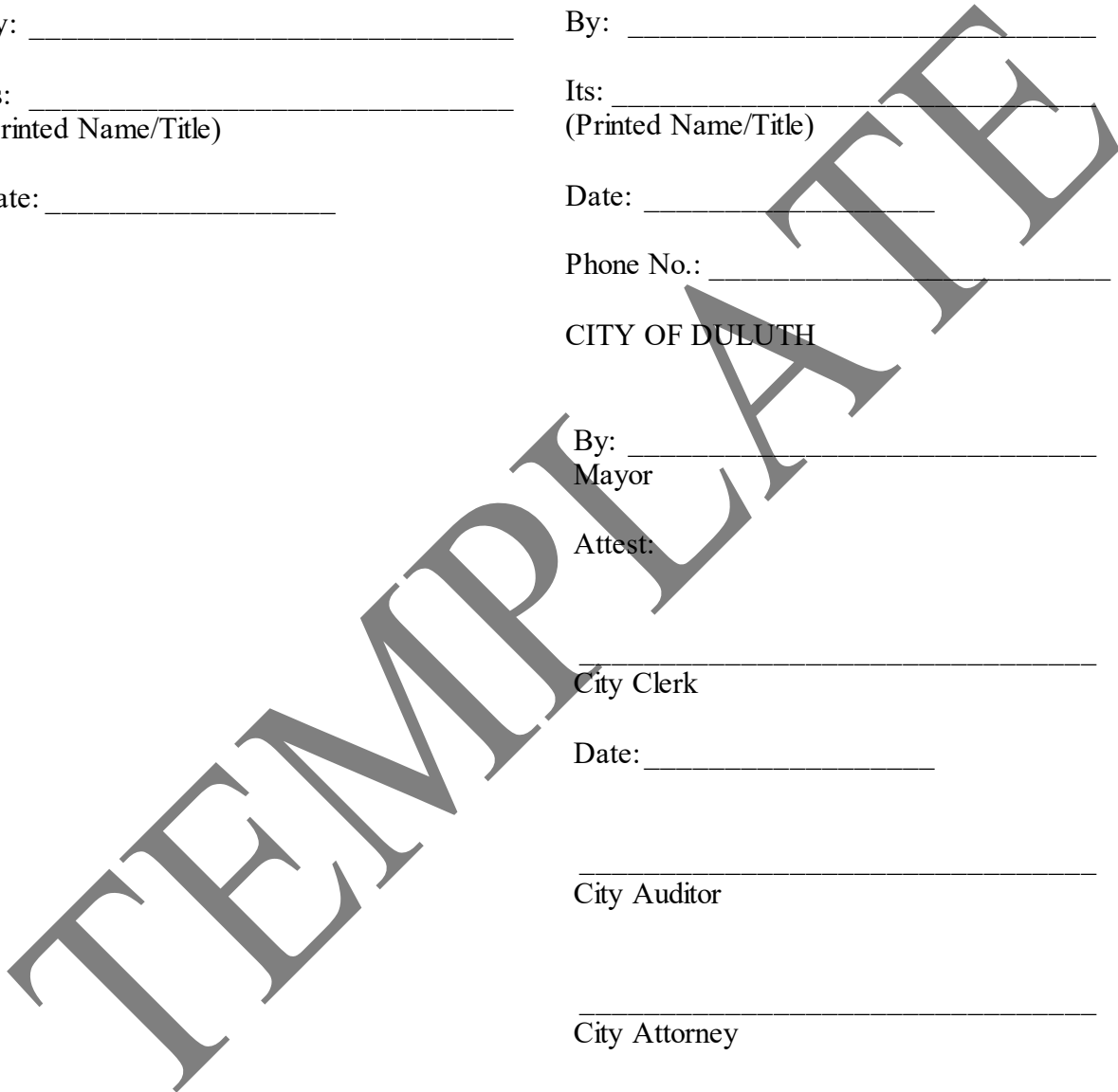
Attest:

\_\_\_\_\_  
City Clerk

Date: \_\_\_\_\_

\_\_\_\_\_  
City Auditor

\_\_\_\_\_  
City Attorney



**SUBCONTRACTOR'S  
AGREEMENT TO BE BOUND  
PROJECT LABOR AGREEMENT**

The undersigned EMPLOYER (subcontractor) agrees that it has reviewed a copy of the Project Labor Agreement for the \_\_\_\_\_ Project located in Duluth, Minnesota, with the Duluth Building & Construction Trades Council and further agrees to become a party to and bound to the foregoing Agreement.

This form is to be completed by subcontractor and submitted to the Project Contractor. Project Contractor shall retain and submit to City of Duluth or Duluth Building & Construction Trades Council upon request.

Attest:

SIGNED FOR THE EMPLOYER:

Dated: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Company Address

\_\_\_\_\_  
Phone No., Job Site and/or Office

\_\_\_\_\_  
Fax No.

\_\_\_\_\_  
Signer's Name

\_\_\_\_\_  
Signer's Title

## SCHEDULE "A"

For a copy of the current Local Area Collective Bargaining Agreement referenced in Article II, Section 9 of the PLA please contact directly the Local Union representing the craft for the work to be performed (see attached contact list) or contact the Duluth Building & Construction Trades Council.

- A-1 Asbestos Workers Local 49
- A-2 Boilermakers Local 647
- A-3 BAC Local 1 Chapter 3 Duluth and Iron Range
- A-4 Carpenters Local 361
- A-5 Cement Masons/Plasters Local 633
- A-6 Elevator Constructors Local 9
- A-7 IBEW Local 242
- A-8 Iron Workers Local 512
- A-9 Laborers Local 1091
- A-10 Millwrights Local 1348
- A-11 Operating Engineers Local 49
- A-12 Painters & Allied Trades Local 106
- A-13 Plumbers & Fitters Local 11
- A-14 Roofers Local 96
- A-15 Sheet Metal Workers Local 10
- A-16 Sprinkler Fitters Local 669
- A-17 Teamsters Local 346

Affiliated AFL-CIO

# DULUTH BUILDING AND CONSTRUCTION TRADES COUNCIL

2002 LONDON ROAD

LABOR CENTER

DULUTH, MINN. 55812



## ASBESTOS WORKERS LOCAL 49

Dave Cartwright  
2002 London Road #210  
Duluth, MN 55812  
(218) 724-3223 / Fax# 724-1870  
[dave@insulatorslocal49.org](mailto:dave@insulatorslocal49.org)

## CARPENTERS LOCAL 361

Chris Hill  
5238 Miller Trunk Hwy  
Hermantown, MN 55811  
(218) 724-3297 / Fax# 724-8536  
[chill@ncsrec.org](mailto:chill@ncsrec.org)

## IBEW LOCAL 242

Don Smith  
2002 London Road #111  
Duluth, MN 55812  
(218) 728-6895 / Fax# 728-1965  
[dsmithc1242@union-ibew.com](mailto:dsmithc1242@union-ibew.com)

## MILLRIGHTS & MACHINERY ERECTORS LOCAL 1348

Wayne Nordin  
726 4<sup>th</sup> Street N  
Virginia, MN 55792  
(218) 741-6314 / Fax# 741-6017  
[www.mma1348.com](http://www.mma1348.com)

## PLUMBERS & FITTERS LOCAL 11

Jeff Daveau, *Treasurer*  
4402 Airpark Boulevard  
Duluth, MN 55811  
(218) 727-2199 / Fax# 727-2298  
[jeff@ualocal11.com](mailto:jeff@ualocal11.com)

## SPRINKLER FITTERS LOCAL 669

James Westby  
PO Box 398  
Mabel, MN 55954  
(507) 493-5671 / Fax# 493-5481  
[westby@mabeltel.com](mailto:westby@mabeltel.com)

## BOILERMAKERS LOCAL 647

Bill Polchow  
1007 NW 4<sup>th</sup> Street, Ste C  
Grand Rapids, MN 55744  
(218) 326-2522 / Fax# SAME  
[bpolchow647@aol.com](mailto:bpolchow647@aol.com)

## CEMENT MASONS LOCAL 633

Michael Syversrud  
2002 London Road #112  
Duluth, MN 55812  
(218) 724-2323 / Fax# 724-2472  
[mikesy@local633.org](mailto:mikesy@local633.org)

## IRON WORKERS LOCAL 512

Darrell Godbout, *Vice President*  
3752 Midway Road  
Hermantown, MN 55810  
(218) 724-5073 / Fax# 724-1525  
[darrell@iron512.com](mailto:darrell@iron512.com)

## OPERATING ENGINEERS LOCAL 49

Eric Gulland & Mike Parrott  
2002 London Road #116  
Duluth, MN 55812  
(218) 724-3840 / Fax# 728-1441  
[egulland@local49.org](mailto:egulland@local49.org)  
[mwparrott@local49.org](mailto:mwparrott@local49.org)

## ROOFERS LOCAL 96

Vance Anderson  
1145 Villa Vista Circle  
Cromwell MN 55726  
(218) 644-1096 / Fax# SAME  
[vanloc96@yahoo.com](mailto:vanloc96@yahoo.com)

## TEAMSTERS LOCAL 346

Rod Aistead  
2802 West 1<sup>st</sup> Street  
Duluth, MN 55806  
(218) 628-1034 / Fax# 628-0246  
[local@teamsters346.com](mailto:local@teamsters346.com)

## BAC LOCAL #1 CHAPTER 3 DULUTH & IRON RANGE

Stan (Ogie) Paczynski  
2002 London Road #100  
Duluth, MN 55812  
(218) 724-8374 / Fax# 724-8341  
[spaczynski@bac1mn-nd.org](mailto:spaczynski@bac1mn-nd.org)

## ELEVATOR CONSTRUCTORS LOCAL 9

Dave Aaserud  
433 Little Canada Rd E  
Little Canada, MN 55117  
(651) 287-0817 / Fax# 287-0820  
[d.aaserud@local9.com](mailto:d.aaserud@local9.com)

## LABORERS LOCAL 1091

Dan Olson, *Secretary*  
2002 London Road #119  
Duluth, MN 55812  
(218) 728-5151 / Fax# 728-2431  
[labores@local1091.com](mailto:labores@local1091.com)

## PAINTERS LOCAL 106

Craig Olson, *President*  
2002 London Road #106  
Duluth, MN 55812  
(218) 724-6466 / Fax# 724-7359  
[president@duluthbuildingtrades.com](mailto:president@duluthbuildingtrades.com)

## SHEET METAL WORKERS LOCAL 10

Doug Christy  
6279 Industrial Road  
Saginaw, MN 55779  
(218) 724-6873 / Fax# SAME  
[dchristy@smw10.org](mailto:dchristy@smw10.org)



