

CONSTRUCTION SPECIFICATIONS

October 2, 2014

Project #: 14-4-RH

Bid #: 14-0612

Bid Opening Date: October 28, 2014 @ 2:00pm CST

City of Duluth Street Maintenance Toolhouse HVAC & Lighting Replacement Duluth, MN

City of Duluth

Property and Facilities Management
1532 W Michigan Street
Duluth, MN 55806
(218) 730-4432



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END OF DOCUMENT

CITY OF DULUTH INVITATION TO BID

PROJECT NAME/DESCRIPTION: City of Duluth Street Maintenance Toolhouse
HVAC & Lighting Replacement

PROJECT NUMBER: 14-4-RH

BID NUMBER: 14-0612

Sealed bids will be received by the City Purchasing Agent in and for the Corporation of the City of Duluth, Minnesota in Room 100 City Hall, Duluth, Minnesota 55802, (218) 730-5340 at 2:00 p.m., local time on Tuesday, October 28, 2014, for the City of Duluth Street Maintenance Toolhouse HVAC & Lighting Replacement; immediately thereafter, bids will be taken to Room 106A City Hall where they will be publicly opened and read aloud.

NOTICE TO BIDDERS:

1. **A Project Labor Agreement (PLA) will be required for any bid that is over or could virtually go over \$150,000.**
2. **Unless a Certificate of Exemption is provided, any out-of-state bidder receiving a bid award will have 8% retained from invoice payments on any contracts over \$50,000. Submit a signed copy from the State of Minnesota when submitting Payment and Performance Bonds. This form may be found at the following web address:**
http://www.revenue.state.mn.us/Forms_and_Instructions/sde.pdf
3. **A mandatory pre-bid meeting and walk-thru of the site will take place at 10am, Thursday, October 16, 2014, at the project site, 105 North 40th Avenue West, Duluth, Minnesota**

This advertisement is also available on the City of Duluth website at
http://www.duluthgov.info/db_frames/bid_information.cfm

ONLY IF REQUIRED – Each bidder must review the 2014 edition of the City of Duluth Public Works/Utilities Department – Engineering Division Standard Construction Specifications on the city website (www.duluthmn.gov) as these Specifications are incorporated by reference and deemed to be a part of this project as if fully incorporated and set forth herein.

In general, this project consists of: Replacement of unit heaters, new exhaust and make-up air units, replacement and relocation of furnaces, new temperature controls, replacement of lighting and controls.

Proposal forms, contract documents, plans and specifications as prepared by the firm of Gausman & Moore are on file at the following offices: City Architect's Office; Duluth Builder's Exchange; McGrawhill Construction; Minnesota Builder's Exchange; Reed Construction Data.

Copies of these plans and specifications may be obtained from Sheldon Planroom, 124 E Superior St, Duluth, MN 55802. Copies of bidding documents may be obtained by purchase from Sheldon's.

A certified check or bank draft payable to the order of the City of Duluth, negotiable U.S. Government Bonds (at par value), or a satisfactory bid bond executed by the bidder and acceptable surety, in an amount equal to five percent (5%) of the total bid, shall be submitted with each bid.

Attention is called to the fact that not less than the minimum salaries, wages and benefits as set forth in the contract documents must be paid on this project. The contractor must take affirmative action to ensure that the employees and applicants for employment are not discriminated against because of their race, color, creed, sex or national origin and must meet the affirmative action goals. Contractors are encouraged to subcontract with disadvantage business enterprises when possible.

The contractor will comply with all local, state and federal laws, rules and regulations applicable to the contract to the work to be done and materials to be supplied hereunder. All building permits are to be acquired from the Building Safety Division and paid for by the contractor.

The City of Duluth reserves the right to reject any or all bids or to waive any informalities in the bidding. Bids may be held by the City of Duluth for a period not to exceed thirty (30) days from the date of opening the bids for the purpose of reviewing the bids and investigating the qualifications of the bidders, prior to awarding the contract.

The City of Duluth is an Equal Opportunity Employer. Contractor shall comply with all applicable Equal Employment Opportunity laws and regulations.

CITY OF DULUTH

Dennis Sears
Purchasing Agent

INSTRUCTIONS TO BIDDERS

1. **Use of Separate Bid Forms.** These contract documents include a complete set of bidding and contract forms which are for the convenience of bidders and are not to be detached from the contract document, filled out, or executed. Separate copies of bid forms are furnished for that purpose.
2. **Interpretations or Addenda.** No oral interpretation will be made to any bidder as to the meaning of the contract documents or any part thereof. Every request for such an interpretation shall be made in writing and emailed to *Robert Hurd, City of Duluth Facility Operations*: rhurd@duluthmn.gov. Any inquiry received seven or more days prior to the date fixed for opening of bids will be given consideration. Every interpretation made to a bidder will be in the form of an addendum to the contract documents, and when issued, will be on file in the offices of the Purchasing Agent and City Architect at least five days before bids are opened. In addition, all addenda will be emailed to each person holding contract documents, but it shall be the bidder's responsibility to make inquiry as to the addenda issued. All such addenda shall become part of the contract, and all bidders shall be bound by such addenda, whether or not received by the bidders.
3. **Inspection of Site.** Each bidder should visit the site of the proposed work and become fully acquainted with the existing conditions there relating to construction and labor, and should fully understand the facilities involved, the difficulties, and the restrictions attending the performance of the contract. The bidder should thoroughly examine and become familiar with the drawings, technical specifications, and all other contract documents. The contractor, by the execution of the contract, shall in no way be relieved of any obligation under it due to failure to receive or examine any form or legal instrument or to visit the site and become acquainted with the existing conditions; and the City of Duluth will be justified in rejecting any claim based on facts regarding the failure to do so.
4. **Alternative Bids.** No alternative bids will be considered unless alternative bids are specifically requested by the technical specifications.
5. **Bids.**
 - a. All bids must be submitted on forms supplied by the City of Duluth Purchasing Agent and shall be subject to all requirements of the contract documents, including the drawings, and these Instructions to Bidders. All bids must be regular in every respect; and no interlineations, excisions, or special conditions shall be made or included in the bid form by the bidder.
 - b. Bid documents including the bid and the bid guaranty shall be enclosed in an envelope which shall be sealed and clearly labeled with the project number, if any, name of bidder, and date and time of bid opening, in order to guard against premature opening of the bid. If proposal is mailed, this envelope shall be placed in another envelope which shall be sealed and labeled with project number, if any, name of bidder, and date and time of bid opening -- and addressed to City of Duluth Purchasing Agent, 100 City Hall, Duluth, Minnesota 55802.

c. The City of Duluth may consider as irregular any bid on which there is an alteration of or departure from the bid form hereto attached, and at its option may reject the same.

d. If the project is awarded, it will be awarded by the City of Duluth to the lowest responsible bidder assuming that the bids are within funds available based on the lowest base bid and or in combination with selected alternates (if any). The alternates will be accepted in numerical priority order, as shown on the bid form. By the award of the contract, it is assumed that the work will be completed within the time-frame as specified within the contract documents.

e. Each bidder shall include in the bid the following information:

Principals -- Names
Social Security Numbers
Home Addresses, including city, state, & zip code

Firm -- Name
Treasury Number
Address
City, State & Zip Code

Mechanical & Electrical Subcontractors -- Names of firms that will do the mechanical and electrical work and the amounts of the mechanical and electrical sub-bids, if applicable and when (where indicated on Bid Proposal Form).

6. Bid Guaranty.

a. The bid must be accompanied by a bid guaranty which shall not be less than five percent (5%) of the amount of the bid. At the option of the bidder, the guaranty may be a certified check, bank draft, negotiable U.S. Government bond (at par value), or a bid bond. No bid will be considered unless it is accompanied by the required guaranty. Certified check or bank draft must be made payable to the order of the City of Duluth, Minnesota. Cash deposits will not be accepted. The bid guaranty shall insure the execution of the agreement and the furnishing of the surety bond or bonds by the successful bidder, all as required by the contract documents.

b. Revised bids submitted before the opening of bids, whether forwarded by mail or telegram, if representing an increase in excess of two percent (2%) of the original bid, must have bid guaranty adjusted accordingly; otherwise, the bid will not be considered.

c. Certified checks or bank drafts, or the amount thereof, bid bonds, and negotiable U.S. Government bonds of unsuccessful bidders, will be returned as soon as practical after the opening of bids.

7. Collusive Agreements

a. The successful bidder on each City of Duluth construction project shall be required to execute a City of Duluth non-collusive affidavit to the effect that he has not entered into a collusive agreement with any other person, firm, or corporation in regard to any bid submitted.

b. Before executing any subcontract, the successful bidder shall submit the name of any proposed subcontractor for prior approval, and an affidavit substantially in the form provided in Section 103 of General Conditions hereof.

8. Unit Prices. The unit price for each of the several items in the proposal of each bidder shall include its prorata share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price bid represents the total bid. Any bid not conforming to this requirement may be rejected as informal. The special attention of all bidders is called to this provision; for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation allowed, provided the net monetary value of all such additive and subtractive changes in quantities of such items of work (i.e., difference in cost) shall not increase or decrease the original contract price by more than twenty-five percent (25%), except for work not covered in the drawings and technical specifications as provided for in Section 109 hereof.

9. Corrections. Erasures or other changes in the bids must be explained or noted over the signature of the bidder.

10. Time for Receiving Bids.

a. Bids received prior to the advertised hour of opening will be securely kept, sealed. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered.

11. Opening of Bids. At the time and place fixed for the opening of bids, the City Purchasing Agent will cause to be opened and publicly read aloud every bid received within the time set for receiving bids, irrespective of any irregularities therein. Bidders and other persons properly interested may be present, in person or by representative.

12. Withdrawal of Bids. Bids may be withdrawn by request of the bidder prior to bid opening. The bid guaranty of any bidder withdrawing a bid will be returned promptly.

13. Award of Contract: Rejection of Bids.

a. The contract will be awarded to the responsible bidder submitting the lowest bid complying with the conditions of the Invitation to Bid. The City of Duluth, however, reserves the right to reject any and all such bids and to waive any informality in bids received whenever such rejection or waiver is in its interest.

b. The City of Duluth reserves the right to consider as unqualified to do the work of general

construction, any bidder who does not habitually perform with his own forces the major portions of the work involved in construction of the improvements embraced in the contract documents.

14. Execution of Agreement: Performance and Payment Bond.

a. Subsequent to the award and within ten (10) days after the prescribed forms are presented for signature, the successful bidder shall execute and deliver to the City of Duluth an agreement in the form as furnished by the City, in such number of copies as the City of Duluth may require.

b. Having satisfied all conditions of award as set forth elsewhere in these documents, the successful bidder shall, within the period specified in paragraph "a" above, furnish:

1) A performance bond for the use and benefit of the City of Duluth to complete the contract according to its terms, and conditioned on saving the City of Duluth harmless from all costs and charges that may accrue on account of completing the specified work; and

2) A payment bond for the use and benefit of all persons furnishing labor and materials for the performance of the contract conditioned upon the payment, as they become due, of all just claims for labor and materials.

Both the performance bond and the payment bond shall be in a penal sum of not less than the amount of the contract awarded. Such bonds shall be in the same form as that included in the contract documents and shall bear the same date as, or a date subsequent to, that of the agreement. A current power of attorney for the person who signs for any surety company shall be attached to such bonds.

c. The failure of the successful bidder to execute such agreement to supply the required bond or bonds within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the City of Duluth may grant, based on reasons determined sufficient by the City of Duluth, shall constitute a default, and the City of Duluth may either award the contract to the next lowest responsible bidder or re-advertise for bids, and may charge against the bidder the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid bond. If a more favorable bid is received by re-advertising, the defaulting bidder shall have no claim against the City of Duluth for a refund.

15. Wages and Salaries.

a. Attention of bidders is particularly called to the requirements concerning the payment of not less than the prevailing wage and salary rates specified in the contract documents and the conditions of employment with respect to certain categories and classifications of employees.

b. The rates of pay set forth under General Conditions are the minimums to be paid during the life of the contract. It is therefore the responsibility of bidders to inform themselves as to local labor conditions, such as the length of work day and work week, overtime compensations, health and welfare contributions, labor supply, and prospective changes or adjustments of rates.

16. Equal Employment Opportunity. Attention of bidders is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin. (See Supplementary General Conditions, Part II, Section II).

17. Employment and Business. Attention of bidders is particularly called to the requirement that, to the greatest extent feasible, opportunities for training and employment made possible by this project shall be given to lower income residents of the City of Duluth. Additionally, efforts should be made, if any work is subcontracted, to award subcontracts to concerns located in or owned in substantial part by persons residing in the City of Duluth.

18. Sales and Use Taxes. It is assumed that, in the preparation of his proposal, the bidder has taken into consideration his liability from any sales, use, or excise tax that might be assessed in the purchase of, storage, use, or consumption of any materials, services, or supplies for performance of the contract work. Any such tax paid by the contractor will be considered as his expense, for which no direct compensation will be made by the City to the contractor over and above the accepted bid.

19. Pre-Bid/Pre-Construction Meetings.

a. Fourteen (14) days prior to bid date, a pre-bid meeting will be held (see Bid Form for time and place). All prime bidders are requested to attend. All bidders will be allowed to make inquiries regarding the contract documents. All formal decisions will be documented by addendum. Failure of any prime bidders to attend this meeting could jeopardize the contract award.

b. Approximately seven (7) days after City Council approval of contract award, the successful bidder is required to attend a pre-construction meeting. At this meeting, the successful bidder will present his construction schedule, cost breakdown, required submittals, etc.

20. Equal Employment Opportunity (EEO) Affirmative Action Police Statement and Compliance Certificate.

a. The successful bidder on each City of Duluth construction project shall be required to execute a certificate substantially in the form herein provided.

b. Before executing any subcontract in excess of \$2,500, the successful bidder shall require the subcontractor to execute a form similar in nature to the form herein provided.



REQUEST FOR BID
 Date: October 2, 2014
 Project #: 14-4-RH
 Bid #: 14-0612

CITY OF DULUTH

RETURN BY BID OPENING TIME TO:

PURCHASING DIVISION
 100 City Hall
 Duluth, Minnesota 55802
 (218) 730-5000
dsears@duluthmn.gov

City of Duluth Street Maintenance Toolhouse HVAC & Lighting Replacement

BID OPENING AT: 2:00PM ON Tuesday, October 28, 2014

NOTE: All bids must be written, signed and transmitted in a sealed envelope, plainly marked with the Subject Matter and Opening Date. The City of Duluth reserves the right to split award where there is substantial savings to the City, waive informalities and to reject any and all bids. Bidder shall state in proposal if Bid price is based on acceptance of total order. All applicable sales and/or use tax are to be included in the bid pricing. Bid will not be the only consideration for award of Bid. All pages shall be signed or initialed by authorized bidder's representative as indicated at the bottom of the page(s) of the request for bid forms. City Project Contact: Robert Hurd, City of Duluth Facility Operations, rhurd@duluthmn.gov. The City of Duluth is an Equal Opportunity Employer.

RETURN BID IN DUPLICATE WITH DUPLICATE DESCRIPTIVE LITERATURE

BID DEPOSIT REQUIREMENTS: 5% of Bid Amount
 Deposit shall mean cash, cashier's check, or corporate surety bond payable to or in favor of City of Duluth.

PERFORMANCE and PAYMENT BONDS: Shall be required of the successful bidder. Bonds shall BOTH be in the full amount of the Contract amount.

INSURANCE CERTIFICATE: Shall be required per specified requirements per the attached requirements.

Designated F.O.B. Point:
 City Architect
 Jobsite(s)

Tax: Federal Excise Exemption
 Account Number: 41-74-0056 K

NAME _____
 ADDR1 _____
 ADDR2 _____
 ADDR3 _____

BASE BID #1 – Exhaust Fan & Make-Up Air System
 \$ _____

BASE BID #2 – Lighting Replacement
 \$ _____

BY: _____
 (Print) Title

BASE BID #3 – Furnace Replacement & Relocation
 \$ _____

 (SIGNATURE)

BASE BID #4 – Unit Price Replacement of One Unit Heater, up to four (4) may be replaced

 Telephone #

\$ _____

 Email

Initial: _____

Date: October 2, 2014

Project #: 14-4-RH

Bid #: 14-0612

**City of Duluth Street Maintenance Toolhouse HVAC & Lighting Replacement
Duluth, MN**

The undersigned, having become familiar with the existing conditions on the project affecting the cost of the work, and with the Contract Documents which include the Invitation to Bid, the Contract Agreement Form, the Non-Collusion Affidavit, any/all Addenda, General Conditions (parts I & II), the Special Conditions, Technical Specifications, Drawings (as listed in the schedule of drawings), EEO Affirmative Action Policy Statement & Compliance Certificate, and Form of Surety Bond or Bond as prepared by the City of Duluth and on file in the office of the City Architect and City Purchasing Agent, and hereby proposes to furnish all supervision, technical personnel, labor, materials, machinery, tools, appurtenances, equipment & services, including utilities and transportation services required to complete the City of Duluth Street Maintenance Toolhouse HVAC & Lighting Replacement.

LUMP SUM BASE BID #1 (Exhaust Fan & Make-Up Air System): \$ _____

Bidder agrees to perform work as describe in the Specification and/or shown on the plans for a Sum of:

(In words - See Additional Page(s) as required)

LUMP SUM BASE BID #2 (Lighting Replacement): \$ _____

Bidder agrees to perform work as describe in the Specification and/or shown on the plans for a Sum of:

(In words - See Additional Page(s) as required)

LUMP SUM BASE BID #3 (Furnace Replacement & Relocation): \$ _____

Bidder agrees to perform work as describe in the Specification and/or shown on the plans for a Sum of:

(In words - See Additional Page(s) as required)

LUMP SUM BASE BID #4 (Unit Price Replacement of One Unit Heater, up to four may be replaced):

\$ _____

Bidder agrees to perform work as describe in the Specification and/or shown on the plans for a Sum of:

(In words - See Additional Page(s) as required)

Initial: _____

Completion Time:

The undersigned hereby affirms & agrees, if awarded a contract, to begin work immediately upon receipt of Notice to Proceed and to substantially complete the work within the time schedule indicated in the Special Conditions, 120 Calendar Days.

Security in the sum of \$ _____ in the form of _____ is submitted herewith in accordance with the Instructions to Bidders, payable without condition to the City of Duluth which is agreed shall be retained as liquidated damages for the delay and extra expense caused the Owner if the undersigned fails to execute the contract and furnish bonds required by the contract documents.

Signed: _____ for

a partnership (or)

_____ a corporation incorporated under the laws of the State of _____.

President: _____ Vice President: _____

Secretary: _____ Treasurer: _____

Address(es): _____

_____, being duly sworn, deposes and says that there are no other persons comprising above company or firm than the above names, and that there are no persons or corporations interested in the forgoing proposals, either as principal or subcontractor, other than the above names; also that the proposals are made without any connection with any person or persons acting in any official capacity whatever for the City of Duluth is directly or indirectly interested therein, or any portion of the profit thereof.

Subscribed and Sworn to before me this _____ day of _____ A.D., _____,

_____ Notary Public.

Stamp/Seal

Addendum Receipt Acknowledgments:

Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)
Addendum #: _____	Dated: _____	_____ (initial)

Initial: _____

PURCHASE ORDER TERMS AND CONDITIONS

1. **ACCEPTANCE.** ACCEPTANCE OF THIS ORDER BY SELLER IS EXPRESSLY LIMITED TO THE TERMS AND CONDITIONS CONTAINED IN THIS ORDER. ANY TERM OR CONDITION STATED BY THE SELLER IN ANY PRIOR PROPOSAL, ON SELLER'S ACKNOWLEDGEMENT FORM, OR IN OTHERWISE ACKNOWLEDGING OR ACCEPTING THIS ORDER IS DEEMED BY BUYER TO BE A MATERIAL ALTERATION OF THIS ORDER AND IS HEREBY OBJECTED TO BY BUYER. ANY SUCH TERM OR CONDITION SHALL BE TOTALLY INAPPLICABLE TO THIS ORDER UNLESS SPECIFICALLY AGREED TO IN A WRITING SIGNED BY AN AUTHORIZED REPRESENTATIVE OF BUYER. ACCEPTANCE OF THE GOODS OR SERVICES COVERED BY THIS ORDER WILL NOT CONSTITUTE ACCEPTANCE BY BUYER OF SELLER'S TERMS AND CONDITIONS. ANY OF THE FOLLOWING ACTS BY SELLER SHALL CONSTITUTE ACCEPTANCE OF THIS ORDER AND ALL OF ITS TERMS AND CONDITIONS SIGNING AND RETURNING A COPY OF THIS ORDER; DELIVERY OF ANY OF THE GOODS ORDERED; INFORMING THE BUYER IN ANY MANNER OF COMMENCEMENT OF PERFORMANCE; OR RETURNING SELLER'S OWN FORM OF ACKNOWLEDGEMENT.
2. **PRICE.** If price (either fixed price or hourly rate[s] in case of a time and material order) and/or delivery is not specified by Buyer on the face of this order, Seller shall immediately submit its best price, delivery date and/or schedule which shall be subject to Buyer's approval and acceptance. Seller warrants that the prices and other terms for the articles sold to Buyer under this order are not less favorable than those extended to all other customers for the same or like articles in equal or less quantities. In the event Seller reduces its price for such articles during the term of this order, Seller agrees to reduce the prices hereof accordingly. If this order is on a time and material basis, the following shall apply; price shall be (a) material at Seller's cost, less scrap, without any charge for handling or otherwise, plus (b) time at agreed hourly rate(s). If both engineering work and manufacturing work are involved, separate hourly rates shall be specified for each thereof. No overtime shall be employed in the performance of this order without Buyer's prior consent and unless separate overtime hourly rate(s) have been specified and agreed upon. No substantial portion of the order shall be subcontracted by Seller without Buyer's written consent. Seller shall maintain adequate accounting records in accordance with generally accepted accounting practice to substantiate all costs, which records shall be open to examination by Buyer at all reasonable times.
3. **PACKING AND SHIPPING.** If Goods are to be delivered under this order, the cost and fee negotiated for this order are deemed to include all packaging and/or storage cost. All Goods shall be packaged, marked, and otherwise prepared in accordance with good commercial practices to obtain lowest shipping rates. On containers, Seller shall mark handling and loading instructions, shipping information, order number, item and account number, shipment date, and names and addresses of Seller and Buyer. An itemized packing list shall accompany each shipment. Overshipments shall be returned to Seller at Seller's risk and expense. Early shipments may, at option of Buyer, be returned to Seller at Seller's risk and expense or may be retained by Buyer and Buyer shall not be liable for payment until the time originally scheduled hereon.
4. **F.O.B. AND RISK OF LOSS.** Unless otherwise specified on the face of this order, the F.O.B. point shall be Buyer's location designated on the face of this order. If transportation is F.O.B. Seller's location, Seller shall bear all risk of loss or damage to the Goods until delivery of the Goods to the carrier. If transportation is F.O.B. Buyer's location, Seller shall bear all risk of loss or damage to the Goods until delivery of the Goods to Buyer's location.
5. **INVOICING.** All invoices shall be rendered in duplicate unless otherwise specified and shall be rendered within 24 hours after each shipment. Taxes, freight and similar charges shall be shown separately. Each invoice shall be accompanied by bill of lading or express receipt. Payments shall be subject to adjustment for errors, shortages, rejections and other causes. Discount period, if any, shall commence on the date invoice is received or goods are received, whichever is later. Buyer secures blanket coverage on all inbound freight. Invoice charges for additional insurance will not be honored unless otherwise specified.
6. **INSPECTION.** All material and workmanship shall be subject to inspection and test by Buyer, both at plant of Seller and of Buyer. Payment shall be subject to final inspection at Buyer's plant. Buyer shall have the right to reject all goods not conforming to specifications or containing defective material or workmanship. Rejected goods shall be returned at Seller's expense and risk, including transportation both ways, promptly after notification of rejection. Buyer may elect to retain defective goods and to remedy defects and deduct cost of remediating same from amount due Seller. Seller warrants that goods shall be produced under a quality control system that provides at a minimum for the prevention and ready detection of discrepancies and for timely and positive corrective action. Seller warrants that he has or is able to obtain the best facilities necessary to meet the technical and regulatory requirements specified. Seller warrants that quality control records are maintained on file for a minimum of one year from date of shipment or as otherwise specified by contract. Buyer reserves the right, upon 72 hours notice, to audit the Seller's facilities and inspection records in connection with this order.
7. **WARRANTY.** In addition and without prejudice to all other warranties expressed or implied by law, Seller warrants that all material or goods covered by this order shall conform to drawings, specifications and other defects. All warranties, both expressed and implied, also constitute conditions and shall survive inspection, acceptance and payment and shall inure to the benefits of Buyer and its customers. Without limitation of any rights by reason of any breach of warranty or otherwise, material or goods which are not as warranted may at any time be returned to Seller at Seller's expense for credit, correction or replacement as Buyer may direct.
8. **COMPLIANCE WITH LAWS.** Seller shall comply with all federal, state, and local laws, ordinances, rules and regulations in the manufacture and sale of the Goods and performance of its Services, including but not limited to the Occupational Safety and Health Act, the Truth in Negotiation Act, the Resources Conservation and Recovery Act and all applicable requirements of the Fair Labor Standards Act. Seller will defend and hold Buyer harmless from any loss, damages, or costs arising from or caused in any way by any actual or alleged violation of any federal, state, or local law, condition, rule, or regulation, or failure by the Seller to (i) have any chemical substances sold hereunder included in the list of approved chemical substances published by the Environmental Protection Agency pursuant to the Toxic Substances Control Act or (ii) provide a completed Material Safety Data Sheet (OSHA Form 20 equivalent) for any chemical substances sold hereunder as required by any federal, state or local law, ordinance, rule or regulation.
9. **CHANGES.** Buyer may, at any time by written order, make changes in drawings, designs, specifications, method of shipment or packing, time or place of delivery, require additional work, or direct the omission of work covered by this order. If any such change causes an increase or decrease in the price under this order, or in the time required for performance, an equitable adjustment shall be made and this order shall be modified in writing accordingly. Any claim for adjustment under this provision must be asserted within 10 days from date this change is ordered and the amount of such claim must be stated in writing within 30 days thereafter.
10. **BUYER'S PROPERTY, MATERIALS, AND EQUIPMENT.** If Buyer furnishes Seller material or "equipment" ("Equipment" is defined as special dies, molds, jigs, tools, gages, test equipment, masks, etc), or pays for such material or "equipment", title thereto shall remain or vest in Buyer, and Seller shall identify, maintain and preserve such material and "equipment" and shall dispose of it (including scrap) in accordance with Buyer's direction. Such material and "equipment", and whenever practical such individual item thereof shall be plainly marked or otherwise adequately identified by Seller as "property of the City of Duluth" and shall be safely stored separate and apart from Seller's property. Seller shall not substitute any property for Buyer's property. Unless otherwise authorized in writing by Buyer, Seller shall use such material or "equipment" only in the performance of purchase orders for Buyer. Seller shall be responsible for any loss, damage, or destruction to such material or "equipment" but Seller shall not include any insurance costs therefore in the cost charged under this order. Also, the "equipment" required to produce the supplies under this order is for the exclusive use of the City of Duluth and is subject to recall upon written notice.
11. **ASSIGNMENT.** Seller shall not assign this order or any rights under this order without the prior written consent of Buyer, and no purported assignment by Seller shall be binding on Buyer without such written consent.
12. **NOTICE OF LABOR DISPUTES.** Whenever an actual or potential labor dispute delays, or threatens to delay, the timely performance of this order, Seller shall immediately notify Buyer in writing of all relevant information with respect to such dispute.
13. **TERMINATION.** (a) Termination Without Cause. Buyer shall have the right, without cause, at any time to terminate all or any part of the undelivered portion of this order by written notice. If Seller has and desires to assert any claim on account of any such termination, Seller shall submit its termination claims to Buyer, in form and with evidence satisfactory to Buyer, promptly, but no later than 90 days after the effective date of the termination. If Seller fails to submit a termination claim within that time, Buyer shall have no liability to Seller on account of the termination. If Seller's termination claim is not acceptable to Buyer and cannot be settled by negotiation, the claim shall be submitted to arbitration. (b) Termination With Cause. If Seller fails to make any delivery in accordance with the agreed delivery date or schedule or terms or conditions applicable to this order, Buyer shall have the right (in addition to any other right or remedy at law or under this agreement) by written notice to terminate all or any part of the undelivered portion of this order without any liability to Seller on account thereof, in the articles elsewhere on such terms and in such manner as Buyer may deem appropriate and Seller shall be liable to Buyer for all excess costs occasioned Buyer thereby.
14. **PATENTS AND COPYRIGHTS.** Seller shall defend, at its own expense, any suit or claim that may be instituted against Buyer or any customer of Buyer for alleged infringement of patents or copyrights relating to the maintenance, sale, or use of the Goods, except for any such infringement resulting from Seller's compliance with detailed designs provided by Buyer, and Seller shall indemnify Buyer and its customers for all costs and damages arising out of such alleged infringement. Buyer shall have the right, at no additional charge, to use and/or reproduce the Seller's applicable literature, such as operating and maintenance manuals, technical publications, prints, drawings, training manuals, and other similar supporting documentation and sales literature. Seller shall advise Buyer of any updated information relative to the foregoing literature and documentation with timely notification in writing.
15. **PUBLIC LIABILITY INSURANCE.** Seller shall hold Buyer and its customer harmless from all injuries, damages and claims arising from performance of work or services covered by this order. Seller shall maintain such insurance as will protect the Seller, the Buyer and his customer from claims under Worker's Compensation Acts and from all other claims for damages, personal injury, or death to employees of the Seller, the Buyer or his Customer, or any other persons which may arise from performance of work or services covered by this order whether performed by the Seller or any Subcontractor or any one directly or indirectly employed by either of them. Certificates of such insurance shall be filed with the Buyer and shall be subject to Buyer's approval for adequacy of protection.
16. **DELAYS.** Time is of the essence. All actual or potential delays of whatever nature must be reported to the Buyer when and as they occur if the event can be expected to result in a delivery later than that shown on the face of this order. Seller agrees to indemnify Buyer for all losses, costs and damages resulting from Seller's delay or failure to deliver.
17. **GENERAL.** This order is formed under and shall be interpreted according to, and governed by, Minnesota law. No waiver by Buyer of any of its rights or remedies hereunder shall be construed as a waiver of any other rights or remedies.

AFFIDAVIT AND INFORMATION REQUIRED OF BIDDERS

Affidavit of Non-Collusion:

I hereby swear (or affirm) under penalty of perjury:

- 1) That I am the bidder (if the bidder is an individual), a partner in the bidder (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the bidder is a corporation);
- 2) That the attached bid or bids have been arrived at by the bidder independently and have been submitted without collusion with and without agreement, understanding, or planned common course of action with any other vendor or materials, supplied, equipment or services described in the invitation to bid, designed to limit independent bidding or competition;
- 3) That the contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids and will not be communicated to any such person prior to the official opening of the bid or bids; and
- 4) That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed: _____

Firm Name: _____

Subscribed and sworn to me before this ____ day of _____, _____

NOTARY PUBLIC _____

My commission expires: _____

Bidder's E.I. Number _____
(Number used on employer's quarterly Federal Tax return)

**EQUAL EMPLOYMENT OPPORTUNITY EEO AFFIRMATIVE ACTION
POLICY STATEMENT & COMPLIANCE CERTIFICATE**

TO: City of Duluth, MN PROJECT NUMBER & DESCRIPTION _____

FROM: _____

(FIRM's name, address, telephone number)

A) **Employment:** It is the policy of the above named FIRM to afford equal opportunity for employment to all individuals regardless of race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance and/or disability. The FIRM will take affirmative action to ensure that we will: (1) recruit, hire, and promote all job classifications without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability, except where sex is a bona fide occupational qualification; (2) base decisions on employment so as to further the principle of equal employment opportunity; (3) ensure that promotion decisions are in accord with the principles of equal employment opportunity by imposing only valid requirements for promotional opportunities; (4) ensure that all personnel actions such as compensation, benefits, transfers, layoffs, return from layoff, FIRM sponsored training, education tuition assistance, social and recreational programs will be administered without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability. The FIRM also intends full compliance with Veteran affirmative action requirements. Additionally, minority and female employees shall be encouraged to participate in all FIRM activities and refer applicants.

I have designated (name) _____ to direct the establishment of and to monitor the implementation of personnel procedures to guide the FIRM's affirmative action program. Where PROJECTS exceed \$500,000, this official shall also serve as the liaison officer that administers the FIRM's "Minority Business Enterprise Program." This official is charged with designing and implementing audit and reporting systems that will keep management informed on a monthly basis of the status of the equal opportunity area.

Supervisors have been made to understand that their work performance is being evaluated on the basis of their equal opportunity efforts and results, as well as other criteria. It shall be the responsibility of the FIRM and its supervisors to take actions to prevent harassment of employees placed through affirmative action efforts.

- B) Reports:** Unless exempted by law and regulation, the FIRM shall make available and file those reports related to equal opportunity as may be required by the City of Duluth and State and Federal compliance agencies. Requirements and Reports are defined in 41CFR60 "Compliance Responsibility for Equal Opportunity" published by the U. S. Department of Labor which is incorporated herein by reference. Additional requirements are defined in various State and Federal Civil Rights Legislation and Rules promulgated thereunder.
- C) Nonsegregated Facilities:** The FIRM certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The FIRM certifies that it will not maintain or provide for its employees any segregated facilities at any of its establishments and that it will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The FIRM agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this certificate. As used in this Certification, the term "segregated facilities" means any waiting rooms, work area, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation for entertainment area, transportation, and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise.
- D) Affirmative Action Compliance Program:** Unless exempted by regulation and law, the FIRM—if the FIRM has 50 or more employees and if the value of current contracts with the City of Duluth exceeds \$50,000—shall prepare and maintain a written affirmative action compliance program that meets the requirement as set forth in 41CFR60.
- E) Non-Compliance:** The FIRM certifies that it is not currently in receipt of any outstanding letters of deficiencies, show cause, probable cause, or other such notification of non-compliance with EEO Laws and Regulations.

- F) **Employment Goals - "Construction" Projects:** It shall be the goal of the FIRM if the PROJECT is of a construction nature that in all on-site employment generated that no less than 3% of the on-site workforce will be minority employees and that no less than 7% of the on-site workforce will be female employees. Further, it is the goal of the FIRM if the PROJECT is of a construction nature that in all on-site employment generated that no less than 3% of the work hours generated shall be worked by minority employees and that no less than 7% of the work hours generated shall be worked by female employees.
- G) **Subcontractors:** The FIRM will for all its PROJECT subcontractors regardless of tier (unless exempted by law and regulation) that received in excess of \$2,500 require that: (1) the subcontractor shall execute an "EEO Statement and Certification" similar in nature to this "Statement and Certification", (2) said documentation to be maintained on file with the FIRM or subcontractor as may be appropriate.

Executed this _____ day of _____, 20__ by:

Printed name and title

Signature

NOTE: In addition to the various remedies prescribed for violation of Equal Opportunity Laws, the penalty for false statements is prescribed in 18 U.S.C. 1001.

Withholding Affidavit for Contractors

IC-134

This affidavit must be approved by the Minnesota Department of Revenue before the state of Minnesota or any of its subdivisions can make final payment to contractors.

Please type or print clearly. This will be your mailing label for returning the completed form.

Company Name			Daytime phone	Minnesota tax ID number
Address			[]	
City	State	Zip	Total contract amount	Month/year work began
			\$	
			Amount still due	Month/year work ended
			\$	

Project number	Project location		
Project owner	Address	City	State

Did you have employees work on this project: Yes No If no, who did the work?

Check the box that describes your involvement in the project and fill in all information requested.

Sole contractor

Subcontractor

Name of contractor who hired you:

Address:

Prime contractor- If you subcontracted out any work on this project, all of your subcontractors must file their own IC-134 affidavits and have them certified by the Department of Revenue before you can file your affidavit. For each subcontractor you had, fill in the information below and attach a copy of each subcontractor's certified IC-134. If you need more space, attach a separate sheet.

Business name	Address	Owner/Officer

I declare that all information I have filled in on this form is true and complete to the best of my knowledge and belief. I authorize the Department of Revenue to disclose pertinent information relating to this project, including sending copies of this form, to the prime contractor if I am a subcontractor, and to any subcontractors if I am a prime contractor, and to the contracting agency.

Contractor's signature _____ Title _____ Date _____

Mail to: MN Dept. of Revenue, Withholding Division, Mail Station 6610, St. Paul, MN 55146-6610

Certificate of Compliance	
Based on records of the Minnesota Department of Revenue, I certify that the contractor who has signed this certificate has fulfilled all the requirements of Minnesota Statutes 290.92 and 290.97 concerning the withholding of Minnesota income tax from wages paid to employees relating to contract services with the state of Minnesota and/or its subdivisions.	
Department of Revenue approval:	Date:

Instructions for Form IC-134

Who must file

If you are a prime contractor, a contractor of a subcontractor who did work on a project for the state of Minnesota of any of its local government subdivisions—such as a county, city, or school district—you must file Form IC-134 with the Minnesota Department of Revenue.

This affidavit must be certified and returned before the state or any of its subdivisions can make final payment for your work.

If you're a prime contractor and a subcontractor on the same project

If you were hired as a subcontractor to do work on a project and you subcontracted all or a part of your portion of the project to another contractor, you are a prime contractor as well. Fill out both the subcontractor and prime contractor areas on a single form.

When to file

The IC-134 cannot be processed until you finish the work. If you submit the form before the project is completed, it will be returned to you unprocessed.

If you are a subcontractor or sole contractor, send in the form when you have completed your part of the project.

If you are a prime contractor, send in the form when the entire project is completed and you have received certified affidavits from all of your subcontractors.

How to file

If you have fulfilled the requirements of Minnesota withholding tax laws, the Department of Revenue will sign your affidavit and return it to you.

If any withholding payments are due to the state, Minnesota law requires certified payments before we approve the IC-134.

Submit the certified affidavit to the government unit for which the work was done to receive your final payment. If you are a subcontractor, submit the certified affidavit to your prime contractor to receive your final payment.

Where to file

Mail to:

MN Dept. of Revenue
Withholding Tax Division
Mail Station 6610
St. Paul, MN 55416-6610

Minnesota tax ID number

You must fill in your Minnesota tax ID number on the form. You must have a Minnesota tax ID number if you have employees who work in Minnesota.

If you don't have a Minnesota ID number, you must apply for one. Call (651) 282-5225 or 1-800-657-3605.

If you prefer, you can get an application (Form ABR) from our web site or by calling or writing us.

If you have no employees and did all the work yourself, you do not need a Minnesota tax ID number. If this is the case, fill in your Social Security number in the space for Minnesota tax ID number and explain who did the work.

The Department of Revenue needs all the information to determine if you have met all state income tax withholding requirements. If all required information is not provided, the IC-134 will be returned to you for completion.

All information on this affidavit is private by state law. It cannot be given to others without your permission, except to the Internal Revenue Service, other states that guarantee the same privacy, and certain government agencies as provided by law.

Information and assistance

If you need help or more information to complete this form, call (651) 282-9999 or 1-800-657-3594.

Additional forms are available on our website at www.taxes.state.mn.us or by calling (651) 296-4444 OR 1-800-657-3676. You can also write for forms at the following address:

Minnesota Tax Forms
Mail Station 1421
St. Paul, MN 55146-1421

TTY users may contact the department through the Minnesota Relay Service at 1-800-627-3529.

We'll provide information in an alternative format upon request to persons with disabilities.

Use of information



CITY OF DULUTH
PERFORMANCE BOND

KNOW ALL MEN BY

THESE PRESENTS: That we:

_____ (contractor's name)
(hereinafter called the "Contractor") located at: _____

_____ (contractor's address)

and _____ (surety's name)

(a corporation holding a certificate of the Insurance Commissioner of the State of Minnesota showing that it is authorized to contract as a surety, hereinafter called the "Surety") located at:

_____ (surety's address)

are held and firmly bound unto the City of Duluth (hereinafter called the "Owner"), in the penal sum of _____

Dollars (\$ _____) for the payment of which we bind ourselves, our heirs, executors and administrators, successors and assigns, for the faithful performance of a written contract for the purpose of:

according to plans, profiles, and specifications thereto annexed. A copy of that contract is incorporated herein by reference and is made a part hereof as if fully copied herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH That,

- A) If the Contractor shall in all respects comply with the terms and conditions of the Contract (which includes the contract documents) and such alterations as may be made in said contract as documents therein provide for, and shall complete the contract in accordance with its terms,
- B) If the Contractor shall indemnify, defend and save harmless the owner from all costs, expenses, damages, injury or conduct, want or care or skill, negligence or default, including patent infringement on the part of the Contractor, agents or employees, in the execution or performance of the contract,
- C) If the Contractor shall indemnify the owner for all costs that may accrue on account of the

enforcing of the terms of the bond, if action is brought on the bond, including reasonable attorney's fees, in any case where such action is successfully maintained,

D) If the Contractor shall comply with all laws pertaining to doing the work under the contract,

Then, this obligation shall be void; the Contractor and Surety jointly and severally agree to pay to the Owner any difference between the sum to which the Contractor will be entitled on the completion of the contract and that which the Owner may be obliged to pay for the completion of the work by contract or otherwise, and any damages, direct or indirect, or consequential, which the Owner may sustain on account of the work, or on account of the failure of the Contractor to properly and in all things, keep and execute all of the provisions of the Contract, provided however that Surety's liability to pay damages is limited to the amount of the Performance Bond as set forth above.

And, the said Contractor and Surety hereby further bind themselves, their successors, executors, administrators and assigns, jointly and severally, that they will employ and fully protect the said Owner against and will pay any and all amounts, damages, costs and judgements which may be recovered against or which the Owner may be called upon to pay to any person or corporation by reason of any damage arising from the performance of said work, repair or maintenance thereof, or the manner of doing the same, or the neglect of the said Contractor or his agents or servants, or the improper performance of the said work by the Contractor or his agents or servants, or the infringements of any patent rights by reason of the use of any material furnished or work done, as aforesaid, or otherwise. For the purpose of this paragraph, a subcontractor shall be deemed to be the agent or employee of the Contractor to the extent of his subcontract.

The Contractor and the Sureties do hereby expressly waive any objection that might be interposed as to the right of the Owner to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either and any of them might interpose to an action brought hereon by any person, firm, or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed, rendered or furnished as aforesaid, upon the ground that there is no law authorizing the Owner to require the foregoing provisions to be placed in this bond.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this bond shall in no way be impaired or affected by any extension of time, modification, omission, addition or change in or to the contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment, subletting or other transfer thereof, or of any part thereof, or of any work to be performed, or of any moneys due or to become due thereunder; and

the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors and other transferees, shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Contractor.

Signed this _____ day of _____, 20____.

Name of Principal

By

Name of Surety

By
Attorney-in-Fact

ACKNOWLEDGEMENTS

State of Minnesota)
) ss. Principal – Individual
County of St. Louis)

This instrument was acknowledged before me on _____
by _____.

Notary Seal

Notary Public

State of Minnesota)
) ss. Principal – Corporate or Partnership
County of St. Louis)

This instrument was acknowledged before me on _____
by _____ as _____
of _____.

Notary Seal

Notary Public

State of Minnesota)
) ss. Surety
County of St. Louis)

Be It Known, That on this _____ day of _____ A. D., 20____, came before me personally
_____, to me personally known, who being
by me duly sworn, did say that he/she is the _____(title) of

the above named corporation which executed the foregoing bond as surety; that the seal affixed to the foregoing
instrument is the corporate seal of said corporation; that said instrument was executed in behalf of said corporation, by
authority of its Board of Directors; that said corporation hold a certificate of the Insurance Commissioner of the State of
Minnesota showing that it is authorized to contract as a surety; and said

acknowledged said instrument to be the free act and deed of said corporation.

Notary Seal

Notary Public

APPROVED AS TO FORM, CORRECTNESS AND VALIDTY HEREOF

Dated this _____ day of _____, 20 ____

Assistant City Attorney Duluth MN

Dated this _____ day of _____, 20 ____

Finance Director Duluth MN



CITY OF DULUTH
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That we:

_____ (contractor's name)
(hereinafter called the "Contractor") located at: _____

_____ (contractor's address)

and _____ (surety's name)

(a corporation holding a certificate of the Insurance Commissioner of the State of Minnesota showing that it is authorized to contract as a surety, hereinafter called the "Surety") located at:

_____ (surety's address)

are held and firmly bound unto the City of Duluth (hereinafter called the "Owner"), for the benefit of persons furnishing labor and materials for the contract set forth below, in the penal sum of

_____ Dollars (\$ _____) for the payment of which we bind ourselves, our heirs, executors and administrators, successors and assigns, for the payment of all labor and materials supplied by any person in the performance of a written contract for the purpose of:

according to plans, profiles, and specifications thereto annexed. A copy of that contract is incorporated herein by reference and is made a part hereof as if fully copied herein.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH That,

- A) If the Contractor shall make payments, as they may become due, to all persons supplying "labor and materials," as defined in Minnesota Statutes Section 574.26, used directly or indirectly by the Contractor, or his Subcontractor, in the prosecution of the work provided for in the contract,
- B) If the Contractor shall indemnify the owner or other claimant for all costs that may accrue on account of the enforcing of the terms of the bond, if action is brought on the bond, including reasonable attorney's fees, in any case where such action is successfully maintained,

Then, this obligation shall be void; otherwise it shall remain in full force and effect.

And, the said Contractor and Surety agree that in accordance with Minnesota Statutes Section 574.26 not only said City, but any person furnishing "labor and materials," as defined in Minnesota Statutes 574.26, may sue on this bond for their use on account of any sums due them for anything so furnished.

The Contractor and the Sureties do hereby expressly waive any objection that might be interposed as to the right of the Owner to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either and any of them might interpose to an action brought hereon by any person, firm, or corporation, including subcontractors, materialmen and third persons, for work, labor, services, supplies or material performed, rendered or furnished as aforesaid, upon the ground that there is no law authorizing the Owner to require the foregoing provisions to be placed in this bond.

And the Surety, for value received, hereby stipulates and agrees that the obligations of the Surety and this bond shall in no way be impaired or affected by any extension of time, modification, omission, addition or change in or to the contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provision thereof, or by any assignment, subletting or other transfer thereof, or of any part thereof, or of any work to be performed, or of any moneys due or to become due thereunder; and the said Surety does hereby waive notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers, and hereby stipulates and agrees that any and all things done and omitted to be done by and in relation to executors, administrators, successors, assignees, subcontractors and other transferees, shall have the same effect as to said Surety as though done or omitted to be done by and in relation to the Contractor.

Signed this _____ day of _____, 20____.

Name of Principal

By

Name of Surety

By _____
Attorney-in-Fact

ACKNOWLEDGEMENTS

State of Minnesota)) ss. Principal – Individual
County of St. Louis)

This instrument was acknowledged before me on _____
by _____.

Notary Seal

Notary Public

State of Minnesota)) ss. Principal – Corporate or Partnership
County of St. Louis)

This instrument was acknowledged before me on _____
by _____ as _____
of _____.

Notary Seal

Notary Public

State of Minnesota)) ss. Surety
County of St. Louis)

Be It Known, That on this _____ day of _____ A. D., 20____, came before me personally
_____, to me personally known, who being
by me duly sworn, did say that he/she is the _____ (title)
of _____

the above named corporation which executed the foregoing bond as surety; that the seal affixed to the foregoing
instrument is the corporate seal of said corporation; that said instrument was executed in behalf of said corporation, by
authority of its Board of Directors; that said corporation hold a certificate of the Insurance Commissioner of the State of
Minnesota showing that it is authorized to contract as a surety; and said _____
acknowledged said instrument to be the free act and deed of said corporation.

Notary Seal

Notary Public

APPROVED AS TO FORM, CORRECTNESS AND VALIDTY HEREOF

Dated this _____ day of _____, 20 ____

Assistant City Attorney Duluth MN

Dated this _____ day of _____, 20 ____

Finance Director Duluth MN

City of Duluth Indemnification & Insurance Requirements

(Updated February 16, 2011)

(Please Be Sure These Requirements Can Be Met Before Submitting Your Response)

INDEMNIFICATION CLAUSE

The Contractor will defend, indemnify and save the City harmless from all costs, charges, damages, and loss of any kind that may grow out of the matter covered by this contract. Said obligation does not include indemnification of the City for claims of liability arising out of the sole negligent or intentional acts or omissions of City but shall include but not be limited to the obligation to defend, indemnify and save harmless the City in all cases where claims of liability against the City arise out of acts or omissions of City which are derivative of the negligence or intentional acts or omissions of Contractor such as, and including but not limited to, the failure to supervise, the failure to warn, the failure to prevent such act or omission by Contractor and any other such source of liability. In addition, Contractor will comply with all local, state and federal laws, rules and regulations applicable to this contract and to the work to be done and things to be supplied hereunder.

INSURANCE

- a. Contractor shall provide the following minimum amounts of insurance from insurance companies authorized to do business in the state of Minnesota, which insurance shall indemnify Contractor and City from all liability described in the paragraph above, subject to provisions of subparagraph below.
 - (1) Worker's compensation in accordance with the laws of the state of Minnesota.
 - (2) Public Liability and Automobile Liability Insurance with limits not less than **\$1,500,00** Single Limit, and twice the limits provided when a claim arises out of the release or threatened release of a hazardous substance; shall be in a company approved by the city of Duluth; and shall provide for the following: Liability for Premises, Operations, Completed Operations, Independent Contractors, and Contractual Liability.
 - (3) City of Duluth shall be named as **Additional Insured** under the Public Liability, Excess/Umbrella Liability* and Automobile Liability, or as an alternate, Contractor may provide Owners-Contractors Protective policy, naming itself and the City of Duluth. Contractor shall also provide evidence of Statutory Minnesota Worker's Compensation Insurance. Contractor to provide Certificate of Insurance evidencing such coverage with 30-days notice of cancellation, non-renewal or material change provisions included. The City of Duluth does not represent or guarantee that these types or limits of coverage are adequate to protect the Contractor's interests and liabilities.

**An umbrella policy with a “following form” provision is acceptable if written verification is provided that the underlying policy names the City of Duluth as an additional insured.*

- (4) If a certificate of insurance is provided, the form of the certificate shall contain an unconditional requirement that the insurer notify the City without fail not less than 30 days prior to any cancellation, non-renewal or modification of the policy or coverages evidenced by said certificate and shall further provide that failure to give such notice to City will render any such change or changes in said policy or coverages ineffective as against the City.
- (5) **The use of an “Acord” form as a certificate of insurance shall be accompanied by two forms – 1) ISO Additional Insured Endorsement (CG-2010 pre-2004) and 2) Notice of Cancellation Endorsement (IL 7002) or equivalent, as approved by the Duluth City Attorney’s Office.**
- b. The insurance required herein shall be maintained in full force and effect during the life of this Agreement and shall protect Contractor, its employees, agents and representatives from claims and damages including but not limited to personal injury and death and any act or failure to act by Contractor, its employees, agents and representatives in the negligent performance of work covered by this Agreement.
- c. Certificates showing that Contractor is carrying the above described insurance in the specified amounts shall be furnished to the City prior to the execution of this Contract and a certificate showing continued maintenance of such insurance shall be on file with the City during the term of this Contract.
- d. The City shall be named as an additional insured on each liability policy other than the workers’ compensation policies of the Contractor.
- e. The certificates shall provide that the policies shall not be changed or canceled during the life of this Contract without at least 30 days advanced notice being given to the City.
- f. Contractor shall be required to provide insurance meeting the requirements of this Paragraph unless Contractor successfully demonstrates to the satisfaction of the City Attorney, in the exercise of his or her discretion, that such insurance is not reasonably available in the market. If Contractor demonstrates to the satisfaction of the City Attorney that such insurance is not reasonably available, the City attorney may approve an alternative form of insurance which is reasonably available in the market which he or she deems to provide the highest level of insurance protection to the City which is reasonably available.

Procedure verified by:

_____ Date _____
Don Douglas, Claims Adjuster
Duluth City Attorney’s Office

PRE-2004 CG 2010

A. **Section II - Who Is an Insured** is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of your ongoing operations performed for that insured.

NOTICE OF CANCELLATIONS ENDORSEMENT IL-7002 (10-90)

All Coverage Parts included in this policy are subject to the following condition: If we cancel this policy for any reason other than non-payment of premium, we will mail advance notice to the person(s) or organization(s) as shown in the Schedule.

Schedule	
Person or Organization (Name and Address)	Advance Notice (Days)
City of Duluth Purchasing Division Room 100 City Hall 411 West First Street Duluth, MN 55802	30

GENERAL CONDITIONS 4-15-11

PART I

101. DEFINITIONS

Wherever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

- a. The term "Contract" means the Contract executed by the City of Duluth in its capacity as agent for the City of Duluth and the Contractor, of which these GENERAL CONDITIONS form a part.
- b. The term "City" means the City of Duluth, Minnesota, which is authorized to undertake this Contract and within which the Project Area is situated or any employee of the City of Duluth designated by the City of Duluth for the purpose of inspecting, directing, or having in charge the work embraced in this Contract.
- c. The term "Contractor" means the person, firm, or corporation entering into the Contract with the City to construct and install the Improvements embraced in this Contract.
- d. The term "Project Area" means site within which is specified Contract limits of the Improvements contemplated to be constructed in whole or in part under this Contract.
- e. The term "Architect" means the architect or engineer licensed to practice architecture or engineering and serving the City with architectural or engineering services, or his authorized representative or successor.
- f. The term "Change Order" means a written order to the Contractor, signed by the City, issued after execution of the Contract, authorizing and directing a change in the Work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by Change Order.
- g. The term "Contract Documents" means and shall include the following: Executed Agreement, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Conditions, Special Conditions, Technical Specifications, and Drawings (as listed in the Schedule of Drawings), and all requested submittals such as Certificate of Insurance, performance and payment bonds, EEO Affirmative Action Policy Statement & Compliance Certificate, Certificate of Non-Collusion.
- h. The term "Drawings" means the drawings listed in the Schedule of Drawings.
- i. The term "Field Order" means a written interpretation necessary for the proper execution of the Work, in the form of drawings or otherwise issued to the Contractor by the City or the Architect.
- j. The term "Technical Specifications" means that part of the Contract Documents which describes, outlines and stipulates the quality of the materials to be furnished, the quality of workmanship required, and the methods to be used in carrying out the construction work to be performed under this Contract.
- k. The term "Addenda" or "Addendum" means any changes, revisions or clarifications of the Contract Documents which have been duly issued by the City to prospective Bidders prior to time of receiving Bids.
- l. The term "Work" means all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated in such construction.

102. SUPERINTENDENCE BY CONTRACTOR

- a. Except where the Contractor is an individual and gives his personal superintendence to the work, the Contractor shall provide a competent superintendent, satisfactory to the City and the Architect, on the work at all times during working hours with full authority to act for him. The Contractor shall also provide an adequate staff for the proper coordination and expediting of his work.
- b. The Contractor shall lay out his own work and he shall be responsible for all work executed by him under the Contract. He shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from his failure to do so.

103. SUBCONTRACTS

- a. The Contractor shall not execute an agreement with any subcontractor, or permit any subcontractor to perform any work included in this contract until he has submitted a noncollusion affidavit from the subcontractor in substantially the form attached and has received written approval of such subcontractor from the City.
- b. No proposed subcontractor shall be disapproved by the City except for cause.
- c. The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
- d. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to require compliance by each subcontractor with the applicable provisions of this Contract.
- e. Nothing contained in this Contract shall create any contractual relationship between the subcontractor and the City.

104. OTHER CONTRACTS

The City may award, or may have awarded, other contracts for additional work, and the Contractor shall cooperate fully with such other Contractors, by scheduling his own work with that to be performed under other Contracts as may be directed by the City. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor as scheduled.

105. FITTING AND COORDINATION OF THE WORK

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, subcontractors, or materialmen engaged upon this Contract. He shall be prepared to guarantee to each of his subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

106. MUTUAL RESPONSIBILITY OF CONTRACTORS

If, through acts or neglect on the part of the Contractor, any other Contractor or any subcontractor shall suffer loss or damage on the work, the Contractor shall settle with such other Contractor or subcontractor by agreement or arbitration, if such other Contractor or subcontractor will so settle. If such other Contractor or subcontractor shall assert any claim against the City on account of damage alleged to have been so sustained, the City shall notify this Contractor, who shall defend at his own expense any suit based upon such claim, and, if any judgment or claims against the City shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith.

107. PROGRESS SCHEDULE

The Contractor shall submit for approval immediately after execution of the Agreement, a carefully prepared Progress Schedule, showing the proposed dates of starting and of completing each of the various sections of the work, the anticipated monthly payments to become due the Contractor and the accumulated percent of progress each month.

108. PAYMENTS

1) Partial Payments.

- a. The Contractor shall prepare his requisition of partial payment as of the last day of the month and submit it, with the required number of copies, to the City contracting officer for his approval. The amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting (1) five percent (5%) of the total amount, this sum

to be retained until final payment and (2) the amount of all previous payments. The total value of the work completed to date shall be based on the estimated quantities of work completed and on the unit prices contained in the agreement. The value of materials properly stored on site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be available for the inspection of the Architect and the City.

b. Monthly or partial payments made by the City to the Contractor are moneys advanced for the purpose of assisting the Contractor to expedite the work of construction. The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the City. Such payments shall not constitute a waiver of the right of the City to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the City in all details.

2) Final Payment.

a. After final inspection and acceptance by the Architect and the City of all work under the Contract, the Contractor shall prepare his requisition for final payment which shall be based upon the carefully measured and computed quantity of each item of work at the applicable unit prices stipulated in the Agreement. The total amount of the final payment due the Contractor under this Contract shall be the amount computed as described above less all previous payments. Final payment to the Contractor shall be made subject to his furnishing the City with a release in satisfactory form of all claims against the City arising under and by virtue of his contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release as provided under Section 113 hereof.

b. The City, before paying the final estimate, may require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project) and services to the Contractor, if the City deems the same necessary in order to protect its interest. The City, however, may if it deems such action advisable make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments so made shall in no way impair the obligations of any surety or sureties furnished under this Contract.

c. Withholding of any amount due the City under Section 403, entitled "Liquidated Damages," under SPECIAL CONDITIONS, shall be deducted from the final payment due the Contractor.

3) Withholding Payments

The City may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the City and, if it so elects, may also withhold any amounts due from the Contractor to any subcontractors or material dealers for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the City and will not require the City to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any moneys for their protection unless the City elects to do so. The failure or refusal of the City to withhold any moneys from the Contractor shall in no wise impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

4) Payments Subject to Submission of Certificates.

Each payment to the Contractor by the City shall be made subject to submissions by the Contractor of all written certifications required of him and his subcontractors by Section II, Part II Supplementary General Conditions for Federally, State of Minnesota, and/or City Assisted Activities.

109. CHANGES IN THE WORK

a. The City may make changes in the scope of work required to be performed by the Contractor under the Contract by making additions thereto, or by omitting work therefrom, without invalidating the Contract, and

without relieving the Contractor from any of his obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless is expressly provided otherwise.

b. Except for the purpose of affording protection against any emergency endangering health, life, or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the Improvements or supply additional labor, services, or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the City authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless so ordered.

c. If applicable unit prices are contained in the Agreement (established as a result of either a unit price bid or a Supplement Schedule of Unit Prices), the City shall order the Contractor to proceed with desired changes in the work, the value of such changes to be determined by the measured quantities involved and the applicable unit prices specified in the Contract; provided that, in case of a unit price contract the net value of all changes does not increase or decrease the original total amount shown in the Agreement by more than twenty-five percent (25%) in accordance with Section entitled Unit Prices, under INSTRUCTIONS TO BIDDERS.

d. If applicable unit prices are not contained in the Agreement or if the total net change increases or decreases the total Contract Price more than twenty-five (25%), the City shall, before ordering the Contractor to proceed with desired changes, request an itemized proposal from him covering the work involved in the change after which the procedure shall be as follows:

(1) If the proposal is acceptable, the City will prepare the change order in accordance therewith for acceptance by the Contractor.

(2) If the proposal is not acceptable and prompt agreement between the two parties cannot be reached, the City may order the Contractor to proceed with the work on a cost-plus limited basis; provided that this basis shall not apply to costs incurred by Contractor for any work done by any subcontractor, which work may proceed under the basis set forth in sub-subparagraph (3) below. A cost-plus-limited basis is defined as the net cost of the Contractor's labor, materials, and insurance plus fifteen percent (15%) of said net cost to cover overhead and profit, the total cost not to exceed a specified limit.

(3) If the proposal of the Contractor is not acceptable in whole or part because of the proposals of one or more of the subcontractors and prompt agreement between the two parties cannot be reached, the City may order the Contractor to proceed with the work and reimburse Contractor for work done by any subcontractor on the basis of that subcontractor's net cost of labor, materials, and insurance plus twenty percent (20%) of said net cost to cover overhead and profit, the total cost not to exceed a specified limit. Contractor shall supply all data to City which is necessary to determine any such subcontractor's net costs.

e. Each change order shall include in its final form:

(1) A detailed description of the change in the work.

(2) The Contractor's proposal (if any) of a confirmed copy thereof.

(3) A definite statement as to the resulting change in the Contract price and/or time.

(4) The statement that all work involved in the change shall be performed in accordance with the Contract requirements except as modified by the change order.

110. CLAIMS FOR EXTRA COST

a. If the Contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten (10) days after the receipt of such instructions, and in any event, before proceeding to execute the work, submit his protest thereto in writing to the City, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.

b. Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling

more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.

c. Any discrepancies which may be discovered between actual conditions and those represented by the documents shall at once be reported to the City and work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the City.

d. If, on the basis of the available evidence, the City determines that an adjustment of the Contract Price and/or time is justifiable, the procedure shall then be as provided in Section 109 hereof.

111. TERMINATION, DELAYS, AND LIQUIDATED DAMAGES

a. Termination of Contract.

If the Contractor refuses or fails to execute the work with such diligence as will insure its completion within the time specified in these Contract Documents, or as modified as provided in these Contract Documents, the City, by written notice to the Contractor, may terminate the Contractor's right to proceed with the work. Upon such termination, the City may take over the work and prosecute the same to completion, by contract or otherwise, and the Contractor and his sureties shall be liable to the City for any additional cost incurred by the City in its completion of the work and they shall also be liable to the City for liquidated damages for any delay in the completion of the work as provided below. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work such materials, tools, equipment, and plant as may be on the site of the work and necessary therefore.

b. Liquidated Damages for Delays.

If the work is not completed within the time stipulated in Section 7 (Special Conditions) hereof, including any extensions of time for excusable delays as herein provided, the Contractor shall pay to the City as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) for each calendar day of delay, until the work is completed, the amount as set forth in Section 7 (Special Conditions) hereof and the Contractor and his sureties shall be liable to the City for the amount thereof.

c. Excusable Delays.

The right of the Contractor to proceed shall not be terminated nor shall the Contractor be charged with liquidated damages for any delays in the completion of the work due: (1) To any acts of the Government, including controls or restrictions upon or requisitioning of materials, equipment, tools, or labor by reason of war, National Defense, or any other national emergency;

(2) To any acts of the City;

(3) To causes not reasonably foreseeable by the parties to this Contract at the time of the execution of the Contract which are beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God or of the public enemy, acts of another Contractor in their performance of some other contract with the City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather of unusual severity such as hurricanes, tornadoes, cyclones, and other extreme weather conditions; and

(4) To any delay of any subcontractor occasioned by any of the causes specified in subparagraphs (1), (2) and (3) of this paragraph "c". Provided, however, that the Contractor promptly notify the City in writing within ten (10) days the cause of the delay. Upon receipt of such notification, the City shall ascertain the facts and the cause of the delay. If, upon the basis of facts and the terms of the Contract, the delay is properly excusable, the City shall extend the time for completing the work for a period of time commensurate with the period of excusable delay.

112. ASSIGNMENT OR NOVATION

The Contractor shall not assign or transfer, whether by an assignment or novation, any of its rights, duties, benefits, obligations, liabilities, or responsibilities under this Contract without the written consent of the City; provided, however, that assignments to banks, trust companies, or other financial institutions may be made

without the consent of the City. No assignment or novation expressly provides that the assignment of any of the Contractor's rights or benefits under the Contract is subject to a prior lien for labor performed, services rendered, and materials, tools, and equipment supplied for the performance of the work under this Contract in favor of all persons, firms, or corporations rendering such labor or services or supplying such materials, tools, or equipment.

113. DISPUTES

a. All disputes arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of contract shall, within ten (10) days of the first event giving rise to the dispute, be presented by the Contractor to the City for decision. All papers pertaining to claims shall be filed in quadruplicate. Such notice need not detail the amount of the claim but shall state the facts surrounding the claim in sufficient detail to identify the claim together with its character and scope. In the meantime, the Contractor shall proceed with the work as directed by the City. Any claim not presented within the time limit specified within this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of the first event giving rise to it, the claim will be considered only for a period commencing ten (10) days prior to the receipt by the City of notice thereof.

b. The Contractor shall submit in detail his claim and his proof thereof. Each decision by the City will be in writing and will be mailed to the Contractor by registered or certified mail, return receipt requested, directed to his last known address or actually delivered to Contractor or its managing agent. All interpretations or decisions of the City shall be consistent with the Contract and its intent.

c. If the Contractor does not agree with any decision of the City, he shall in no case allow the dispute to delay the work but shall notify the City promptly that he is proceeding with the work under protest and he may then accept the matter in question from the final release. If the Contractor does not agree with any decision of the City, he may submit the matter to arbitration no later than thirty (30) days after the date on which the Contractor received the City's decision; provided, however, that the City shall not be required to submit to arbitration without its prior written consent; and if the City does consent to arbitration, then the Contractor shall pay all costs of such arbitration.

114. TECHNICAL SPECIFICATIONS AND DRAWINGS

Anything mentioned in the Technical Specifications and not shown on the Drawings or shown on the Drawings and not mentioned in the Technical Specifications, shall be of like effect as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy on Drawings or Technical Specifications, the matter shall be immediately submitted to the City, without whose decision, said discrepancy shall not be adjusted by the Contractor, save only at his own risk and expense.

115. SHOP DRAWINGS

a. All required shop drawings, machinery details, layout drawings, etc. shall be submitted to the Architect or the City, as directed by the City, in two copies for approval sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said shop drawings, etc. until they are approved and no claim, by the Contractor, for extension of the Contract time will be granted by reason of his failure in this respect.

b. Any drawing submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper

adjustment of contract price and/or time, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.

c. If a shop drawing with the Contractor involves only a minor adjustment in the interest of the City not involving a change in Contract price or time, the Architect may approve the drawing. The approval shall be general, shall not relieve the Contractor from his responsibility for adherence to the Contract or for any error in the drawing and shall contain in substance the following: "The modification shown on the attached drawing is approved in the interest of the City to effect an improvement for the Project and is ordered with the understanding that it does not involve any change in the Contract price or time; that it is subject generally to all Contract stipulation and covenants; and that it is without prejudice to any and all rights of the City under the Contract and surety bond or bonds."

116. REQUEST FOR SUPPLEMENTARY INFORMATION

It shall be the responsibility of the Contractor to make timely requests of the City for any additional information not already in his possession which should be furnished by the City under the terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted in writing from time to time as the need is approached, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two (2) weeks after Contract award and shall be as complete as possible at that time. The Contractor shall, if requested, furnish promptly any assistance and information the City may require in responding to these requests of the Contractor. The Contractor shall be fully responsible for any delay in his work or to others arising from his failure to comply fully with the provisions of this Section.

117. MATERIALS AND WORKMANSHIP

a. Unless otherwise specifically provided for in the Technical Specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the Technical Specifications as an equal to any particular standard, the City shall decide the question of equality.

b. The Contractor shall furnish to the City for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval as required full information concerning all other materials or articles which he proposes to incorporate in the work. (See Section 118 hereof)

c. Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.

d. Materials specified by reference to the number or symbol of a specific standard, such as A.S.T.M. Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Invitation for Bids, except as limited to type, class or grade, or modified in such reference. The Standards referred to, except as modified in the Technical Specifications shall have full force and effect as though printed therein.

e. The City may require the Contractor to dismiss from the work such employee or employees as the City may deem incompetent, or careless, or insubordinate.

118. SAMPLES, CERTIFICATES AND TESTS

a. The Contractor shall submit all material or equipment samples, certificates, affidavits, etc. as called for in the Contract Documents or required by the Architect, promptly after award of the Contract and acceptance of the Contractor's Bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the

City or the Architect. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time. Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with Contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Architect or the City in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

b. Approval of any materials shall be general only and shall not constitute a waiver of the City's right to demand full compliance with Contract requirements. After actual deliveries, the City or the Architect will have such check tests made as they deem necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and equipment have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the City or the Architect will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable.

c. Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

(1) The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the City or the Architect; (2) The Contractor shall assume all costs of retesting materials which fail to meet Contract requirements;

(3) The Contractor shall assume all costs of testing materials offered in substitution for those found deficient; and

(4) The City will pay for all other testing expenses.

119. CARE OF WORK

a. The Contractor shall be responsible for all damages to persons or property that occur as a result of his fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all work performed until completion and final acceptance, whether or not the same has been covered in whole or in part by payments made by the City.

b. In an emergency affecting the safety of life, limb or property, including adjoining property, the Contractor, without special instructions or authorization from the City is authorized to act at his own discretion to prevent such threatened loss or injury, and he shall so act. He shall likewise act if instructed to do so by the City. Any compensation claimed by the Contractor on account of such emergency work will be determined by the City as provided in Section 109 hereof.

c. The Contractor shall avoid damage as a result of his operations to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc., and he shall at his own expense completely repair any damage thereto caused by his operations.

d. The Contractor shall shore up, brace, underpin, secure and protect as may be necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the Improvements embraced in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjacent or adjoining property owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the City from any damages on account of settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the City may become liable in consequence of such injury or damage to adjoining structures and their premises.

120. ACCIDENT PREVENTION

- a. The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his fault or negligence in connection with the prosecution of the work. The safety provisions of applicable Federal, State and local laws and ordinances and building and construction codes shall be observed and the Contractor shall take or cause to be taken such additional safety and health measures as the City may determine to be reasonably necessary. Machinery, equipment, and all hazards shall be guarded in accordance with the safety provisions of the A Manual of Accident Prevention in Construction published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws.
- b. The Contractor shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the Owner with reports concerning these matters.

121. SANITARY FACILITIES

The Contractor shall furnish, install, and maintain ample sanitary facilities for the workmen. As the needs arise a sufficient number of enclosed temporary toilets shall be conveniently placed as required by the sanitary codes of the State and Local Government. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

122. USE OF PREMISES

- a. The Contractor shall confine his equipment, storage of materials, and construction operations to the Contract limits as shown on the Drawings and as prescribed by ordinances or permits, or as may be directed by the City, and shall not unreasonably encumber the site or public rights of way with his materials and construction equipment.
- b. The Contractor shall comply with all reasonable instructions of the City and the ordinances and codes of the Local Government regarding signs, advertising, traffic, fires, explosives, danger signals, barricades.

123. REMOVAL OF DEBRIS, CLEANING, ETC.

The Contractor shall, periodically or as directed during the progress of the work, remove and legally dispose of all surplus excavated material and debris, and keep the Project Area and public rights of way reasonably clear. Upon completion of the work, he shall remove all temporary construction facilities, debris and unused materials provided for the work, and put the whole site of the work and public rights of way in a neat and clean condition. Trash burning on the site of the work will be subject to prior approval of the City and existing State and local regulations.

124. INSPECTION

- a. All materials and workmanship shall be subject to inspection, examination or test by the City or the Architect at any and all times during manufacture or construction and at any and all places where such manufacture or construction is carried on. The City shall have the right to reject defective or substandard material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of specified quality without charge therefor. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the City may contract or otherwise have the defects remedied or rejected materials removed from the Project Area and charge the cost of the same against any moneys which may be due the Contractor, without prejudice to any other rights or remedies of the City.

- b. The Contractor shall furnish promptly all materials reasonably necessary for any tests which may be required. (See Section 118 hereof). All tests by the City will be performed in such a manner as not to delay the work unnecessarily and will be made in accordance with the provisions of the Technical Specifications.
- c. The Contractor shall notify the City sufficiently in advance of back-filling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent by the City, the Contractor shall uncover for inspection and recover such facilities all at his own expense, when so requested by the City. Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make an examination of work already completed by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect, due to fault of the Contractor or his subcontractors the Contractor shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus 15 percent of such costs to cover superintendence, general expenses and profit, shall be allowed the Contractor and he shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.
- d. Inspection of materials and appurtenances to be incorporated in the Improvements embraced in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the Technical Specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Site.
- e. Neither inspection, testing, approval nor acceptance of the work in whole or in part, by the City or its agents shall relieve the Contractor or his sureties of full responsibility for materials furnished or work performed not in strict accordance with the Contract.

125. REVIEW BY THE CITY

The City, its authorized representatives and agents, and the Architect, shall, at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, and other relevant data and records pertaining to this Contract; provided, however, that all instructions and approvals with respect to work will be given to the Contractor only by the City through its authorized representative or agents.

126. FINAL INSPECTION

When the work embraced in this Contract is substantially completed, the Contractor shall notify the City in writing that the work will be ready for final inspection on a definite date which shall be stated in such notice. The notice shall bear the signed concurrence of the representative of the City having charge of inspection. If the City determines that the status of the Improvements is as represented, it will make the arrangements necessary to have final inspection commenced on the date stated in such notice, or as soon thereafter as is practicable.

127. DEDUCTION FOR UNCORRECTED WORK

If the City deems it not expedient to require the Contractor to correct work not done in accordance with the Contract Documents, an equitable deduction from the Contract Price will be made by agreement between the Contractor and the City and subject to settlement, in case of dispute, as herein provided.

128. TIME

- a. The Contract Time is the period of time allotted in the Contract for completion of the Work. The date of commencement of the Work is the date established in a notice to proceed issued by the City to the Contractor. The Contractor shall begin the Work upon receipt of the notice to proceed.
- b. The term "day" as used herein shall mean calendar day.
- c. If a date of completion is included in the Contract, it shall be the Date of Substantial Completion of the Work, including authorized extensions thereto. The "Date of Substantial Completion of the Work" is the date certified by the City when construction is sufficiently complete, in accordance with the Contract, so the City may occupy the Work for the use for which it is intended.

129. INSURANCE

The Contractor shall carry the following insurance, at his expense and no direct payment for premiums shall be made by the City. Carriage of such insurance shall in no way alleviate the Contractor of his responsibilities under the contract.

a. The Contractor will be required to carry insurance of the kinds and in the amounts hereinafter specified. The Contractor shall not commence work under the contract until he has obtained all the insurance required by these specifications and until such insurance has been approved by the City Attorney, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor shall have been so obtained and approved.

b. Insurance

The Contractor shall provide Commercial General Liability in an amount not less than \$1,500,000.00 combined single limit and Automobile Liability Insurance in an amount not less than \$1,500,000.00 combined single limit shall be in a company licensed to do business in Minnesota; and shall provide for the following: Liability for Premises, Operations, Completed Operations, Independent Contractors, and Contractual Liability. Property damage coverage for explosion, collapse, and underground Axcu to be included. City of Duluth shall be named as Additional Insured under the Commercial General Liability policy. Contractor shall also provide evidence of Statutory Worker's Compensation Insurance. Contractor to provide Certificate of Insurance evidencing such coverage with 30-day notice of cancellation, non-renewal, or material change provision included.

c. Subcontractor's Insurance

In the event any work contemplated by the contract is sublet, the Contractor shall have the duty to assure that the subcontractors provide insurance in accord with the minimum requirements hereinabove imposed on the Contractor.

d. Proof of Insurance

The Contractor shall not proceed with the work contemplated in this contract until he has furnished the City Attorney of the City of Duluth with satisfactory proof of the existence and carriage of insurance of the kinds and in the amounts specified.

e. Indemnification

The Contractor shall defend, indemnify and save harmless the City and all of its officers, agents and employees from all suits, actions or claims of any character, name and description brought for on account of any injuries or damages received or sustained by any person, persons or property, by or from the act or acts of said Contractor, or by or in consequence of any negligence in safeguarding the work, or through the use of unacceptable materials in constructing the work, or by or on account of any act or omission, neglect or misconduct of said Contractor, or from any claims or amount arising or recovered under the Workmen's Compensation Law or any other law, by-law, ordinance, order or decree, and so much of the money due the said Contractor under and by virtue of his contract, as shall be considered necessary by the City may be retained for the use of the City or in case no money is due, his surety shall be held until such suit or suits, action or actions, claim or claims, for injuries or damages as aforesaid, shall have been settled and suitable evidence to that effect furnished to the City. The Contractor shall indemnify and save harmless the City from any and all losses caused by or on account of any claims or amounts recovered for any infringement of patent,

trademark, or copyright. The unauthorized use by the Contractor of public or private property for any purpose may be considered an injury or damage to the property so used.

130. PATENTS

The Contractor shall hold and save the City, its officers, employees, representatives and agents, and the Architect, harmless from liability of any nature or kind, including costs and expenses, for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the City, unless otherwise specifically stipulated in the Technical Specifications.

131. WARRANTY

No material, supplies, or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the City free from any claims, liens, or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the City. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notices for the work when no formal contract is entered into for such materials.

132. GENERAL GUARANTY

- a. Neither the final certificate of payment nor any provisions in the Contract nor partial or entire use of the improvements embraced in this Contract by the City or the public shall constitute an acceptance of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which subsequently appears. The City will give notice of defective materials and work with reasonable promptness.
- b. If, within one year after the Date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract, any of the Work is found to be defective or not in accordance with the specifications of the Contract, the Contractor shall correct it promptly upon receipt of a written notice from the City to do so, unless the City has previously given the Contractor a written acceptance of such condition or work.

133. ENVIRONMENTAL CONDITIONS

Waste Disposal: The SUBRECIPIENT shall comply with the most recent Minnesota Pollution Control Agency (MPCA) waste disposal requirements and include said disposal requirements in the project's base bid specifications. Waste material, including but not limited to: construction/demolition debris, asbestos-containing material, residential lead paint waste, hazardous waste, and above- and under-ground tanks, shall be disposed of at MPCA-permitted landfill sites only. Copies of all notification, shipment, and landfill receipt records shall be maintained in the subrecipient's project file.

Minnesota Pollution Control Agency
520 Lafayette Rd., St. Paul, MN 55155
(800) 657-3864

- a. Construction/Demolition Waste.

Construction/demolition debris will be disposed of at a Minnesota Pollution Control Agency (MPCA) permitted landfill site only, with copies of all landfill receipts for said debris maintained in the subrecipient's project file.

(Solid Waste Management Rules, Chapter 7001 & 7035)

b. Asbestos-Containing Waste.

All asbestos removal and disposal shall be in strict accordance with all applicable permits. The contract bidder shall include the price of all permits, testing, removal, and disposal in the project base bid.

- Project asbestos-containing material removal pursuant to USEPA 40 CFR 61.145 Standard for Demolition and Renovation.

- All asbestos-containing waste material shall be disposed of pursuant to USEPA 40 CFR 61.150 at a MPCA permitted landfill site only, in accordance with the provisions of USEPA 40 CFR 61.154.

- For all asbestos-containing material, a copy of the MPCA Notification of Demolition and Renovation record and all Waste Shipment records shall be maintained in the subrecipient's project file.

c. Hazardous Waste Material.

The MPCA shall be contacted for instructions on handling and disposing of materials containing Polychlorinated Biphenyls (PCBs) or any other identified/encountered hazardous materials. A copy of all correspondence and disposal records shall be maintained in the subrecipient's project file.

- MPCA Hazardous Waste Compliance Guide -- October 1989, Revised January 1991

- MPCA Hazardous Waste Fact Sheet Checklist -- August 1993

d. Above and Below Ground Storage Tanks.

The MPCA Tanks and Spills Section shall be contacted for instructions on handling or removal of all above- and underground tanks identified/encountered. A copy of all correspondence and disposal records shall be maintained in the subrecipient's project file.

e. Residential Lead Paint Waste.

Projects whose activities produce residential lead paint waste are responsible for the management and proper disposal of the waste at an MPCA permitted landfill site only, pursuant to Minn. Stat. sections 116.87, 116.875, 116.88. A copy of the Residential Lead Abatement Notification and Shipping forms shall be maintained in the subrecipient's project file.

134. CONTRACTOR'S RECORDS

The contractor agrees that, as provided in Minnesota Statutes 16C.05, Subd. 5, contractor's books, records, documents, and accounting procedures and practices are subject to examination by the city or the state auditor for three years from the date of execution of this contract.

(End of Document)

CITY OF DULUTH - PART II -
SUPPLEMENTARY GENERAL CONDITIONS FOR FEDERALLY AND/OR CITY ASSISTED ACTIVITIES
(revised 9/2/09)

The following conditions take precedence over any conflicting conditions in this Contract.

<u>Section</u>	<u>Title</u>
1	Restrictions on Disbursements, Subcontractors Federal Agency Requirements, Separability, Property
2	Miscellaneous Provisions
3	Definitions
4	Environmental Provisions
5	Contract Compliance
6	Records, Reports and Information, Audits and Inspections
7	Conflict of Interest and Lobbying
8	Labor Standards - Physical Improvement Projects
9	Minnesota Department of Transportation Specification 1960 Partial Payments
10	Housing and Urban Development (HUD) Section 4010
11	Equal Opportunity and Affirmative Action
12	Employment Opportunities - "HUD Section 3"
13	Federal Requirements for Minority/Women Business Enterprises Contract Guidance - MPFA
14	Forms

Section I

Restrictions on Disbursements

No money under this Contract shall be disbursed by the City to any Contractor except pursuant to a written contract which incorporates the applicable PART II, Supplementary General Conditions for Federally and/or City Assisted Activities, and unless the Contractor is in compliance with the Federal Agency requirements with regard to accounting and fiscal matters to the extent they are applicable.

Subcontractors

(A) The Contractor shall include in any subcontract the clauses set forth in the PART II, Supplementary General Conditions for Federally and/or City Assisted Activities in their entirety and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

(B) The Contractor shall not subcontract any part of the work covered by this Contract or permit subcontracted work to be further subcontracted without the City's prior written approval of the subcontractors. The City will not approve any subcontractor for work covered by this Contract who is at the time ineligible under the provisions of any applicable regulations issued by a Federal Agency or the Secretary of Labor, United States Department of Labor, to receive an award of such subcontract.

Federal Agency Requirements

Unearned payments under this Contract may be suspended or terminated upon refusal to accept any additional conditions that may be imposed by the Federal Agency at any time; or if the grant, if applicable, to the City under which this Contract is made is suspended or terminated.

Separability

If any provisions of this Contract is held invalid, the remainder of this Contract shall not be affected thereby if such remainder would then continue to conform to the terms and requirements of applicable law.

Property

Acquisition, use, and disposal of all property, materials and goods acquired as a result of activities made possible by this Contract shall be accomplished in accordance with the applicable provisions of Federal Management Circular (FMC)-74-7, as amended.

Section 2

Miscellaneous Provisions

(A) **Copyrights.** In the event this Contract results in a book or other copyrightable material, the author is free to copyright the work, but Federal Agency and the City reserve a royalty-free, nonexclusive, and irrevocable license to reproduce, publish or otherwise use, all copyrighted material and all material which can be copyrighted.

(B) **Patents.** Any discovery or invention arising out of or developed in the course of work aided by this Contract shall be promptly and fully reported to the Federal Agency and the City for determination by the Federal Agency as to whether patent protection on such invention or discovery shall be sought and how the rights in the invention or discovery, including rights under any patent issued thereon, shall be disposed of and administered in order to protect the public interests.

(C) **Political Activity Prohibited.** None of the funds, materials, property or services provided directly or indirectly under this Contract shall be used in the performance of this Contract on any partisan political activity, or to further the election or defeat of any candidate for public office.

(D) **Lobbying Prohibited.** None of the funds under this Contract shall be used for publicity or propaganda purposes designed to support or defeat legislation pending before the Congress or the City.

(E) **Prohibition of and Elimination of Lead-Based Paint Hazard.** Notwithstanding any other provision, the Agency and Contractor agree to comply with the regulation issued by the Secretary of Housing and Urban Development set forth in 37 F. R. 22732-3 and all applicable rules and orders issued thereunder which prohibit the use of lead-based paint in residential structures undergoing Federally assisted construction or rehabilitation and require the elimination of lead-based paint hazards. Every contract or subcontract, including paint, pursuant to which such Federally assisted construction or rehabilitation is performed shall include appropriate provisions prohibiting the use of lead-based paint.

(F) **Architectural Barriers Act.** The design for and construction of any facility funded in whole or in part by this Contract shall be in conformance with the American Standard Specification for Making Buildings and Facilities Accessible and Usable by the Physically Handicapped, Number A-117.1-1971, as modified.

(G) **Relocation and Acquisition.** Any relocation or acquisition resulting from activities funded in whole or in part by this Contract shall be in conformance with the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (40 U.S.C. 4601) and the implementing regulations 24CFR Part 42.

(H) **Prohibition Against Payments of Bonus or Commission.** The assistance provided under this Contract shall not be used in the payment of any bonus or commission for the purpose of obtaining Federal Agency approval for such assistance, or Federal Agency approval of applications for additional assistance, or any other approval or concurrence of a Federal Agency required under this Contract, Federal Law or Federal Regulations thereto; provided, however, that reasonable fees or bonafide technical, consultant, managerial or other such services, other than actual solicitation, are not hereby prohibited if otherwise eligible as project costs.

(I) **Hatch Act.** Where applicable, the Contractor will comply with the provisions of the Hatch Act which limits the political activity of the Contractor's employees.

Section 3
Definitions

(A) City means the City of Duluth, Contracting Officer, or other persons authorized to act on behalf of the City of Duluth.

(B) Contracting Officer is the delegated representative of the City who has the responsibility for administering the Project.

(C) Contractor means an entity, whether public or private, which furnishes (other than standard commercial supplies, office space or printing services) to the City, products, services or supplies as described in this project Contract.

(D) Federal Agency means the United States, the District of Columbia, and any executive department, independent establishment, administrative agency, or instrumentality of the United States or of the District of Columbia, including any corporation, all or substantially all of the stock of which is beneficially owned by the United States, by the District of Columbia, or by any of the foregoing departments, establishments, agencies, and instrumentalities. The term Federal Agency shall also include the person or persons authorized to act on behalf of said Federal Agency.

(E) Project means the activities to be undertaken by the Contractor as described in this Contract, which from time to time may be amended by mutual consent of the City and Contractor.

(F) Subcontractor means an entity, regardless of tier, which has entered into an agreement with the Contractor or another Subcontractor, to undertake certain Project activities as described in that agreement.

(G) The term labor standards, as used in the Contract, means the requirements of the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act (other than those relating to safety and health), the Copeland Act, and the prevailing wage provisions of the other statutes listed in 20 CFR 5.1.

(H) Work means all labor necessary to produce the construction required by the Contract Documents, all materials and equipment incorporated or to be incorporated in such construction, products, services, or supplies required by the Contract Documents, or any other requirements set forth in the Contract.

(I) Additional Definitions, that are applicable to the Labor Standards provisions - Section 8 - of this Contract can be found in 29CFR5.2 as published by the U.S. Department of Labor and said definitions are hereby incorporated by reference into the provisions of this Contract.

Section 4
Environmental Provisions

(A) The Contractor agrees to follow the regulations, requirements, policies, goals and procedures set forth by the Council on Environmental Quality (CEQ) under provisions of the National Environmental Policy Act (NEPA) (Pub. L 91-190, 42 U.S.C. 4321 et seq.), Executive Order 11514, and 40 CFR Part 1500.

(B) **Historic Properties.** The Contractor agrees to follow the regulations, requirements, policies, goals, and procedures set forth under provisions of the National Historic Preservation Act of 1966 (Pub. L. 89-665); Preservation of Historic and Archeological Data Act of 1974 (Pub. L. 93-291); Executive Order 11593; 36 CFR , Part 800 and applicable State legislation or regulations.

(C) **Coastal Zones and Wetlands.** The Contractor agrees to follow the regulations, requirements, policies, goals and procedures set forth under provisions of the Coastal Zone Management Act of 1972 (Pub. L. 92-583) and applicable State legislation or regulations.

(D) **Noise.** The Contractor agrees to comply with provisions set forth in the U.S. Department of Housing and Urban Development Handbook 1390.2, Noise Abatement and Control, Department Policy, Responsibility and Standards, 1971.

(E) **Flood Plain.** The Contractor agrees to comply with the provisions set forth in the Flood Disaster Protection Act of 1973 (Pub. L. 93-234) and implementing regulations; Title 24, Chapter X, Subchapter B, National Flood Insurance Program, Executive Order 11296, and Executive Order 11988 relating to the evaluation of flood hazards.

(F) **Air Quality.** The Contractor agrees to comply with provisions set forth in the Clean Air Act (Pub. L. 90-148) and Clean Air Act Amendments of 1970 (Pub. L. 91-604); and applicable U.S. Environmental Protection Agency implementing regulations.

(G) **Water Quality.** The Contractor agrees to comply with the provisions set forth in the Federal Water Pollution Control Act (Pub. L. 92-500) and applicable U.S. Environmental Protection Agency implementing regulations, and Executive Order 11288 relating to the prevention, control, and abatement of water pollution.

(H) **Wildlife.** The Contractor agrees to comply with the provisions of the Fish and Wildlife Coordination Act (Pub. L. 85-264).

Section 5
Contract Compliance

(A) In the event of the Contractor's noncompliance with the provisions of this Contract or with any of the said regulations, the City may withhold payment(s) until evidence of compliance by the Contractor has been demonstrated, or the Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further City contracts.

(B) In the event the Contract is terminated or canceled as a result of noncompliance with any of the provisions of this Contract, the City may subject to bids the remainder of the Project for which this Contract was made. The City shall have the right upon termination or suspension to withhold all further payments under this Contract to the Contractor. Upon the award of a new contract for the remainder of the Project, the City shall pay to the Contractor an amount no more than the balance remaining due to the Contractor less the sum of the costs incurred by the City which are necessary in preparing the new bid specifications. In the event the amount paid the Contractor prior to the date of termination or cancellation exceeds the full amount of this Contract less the cost of the new contract and the additional costs mentioned above, the Contractor agrees to reimburse the City for such excess amount within ninety days after the new contract is awarded by the above procedures.

(C) Provisions contained in subparagraph (A) and (B) above shall not be interpreted as precluding any authorized Federal, State, or County governmental unit from exercising their legal administrative or other responsibilities in respect to the enforcement by said governmental units of laws or regulations concerning activities of the Contractor.

Section 6
Records

(A) **Establishment and Maintenance of Records.** Records shall be maintained in accordance with requirements prescribed by the Federal Agency or the City with respect to all matters covered by this Contract. Except as otherwise authorized by the Federal Agency, such records shall be maintained for a period of three years after receipt of final payment under this Contract.

(B) **Documentation of Costs.** All costs shall be supported by properly executed payrolls, time records, invoices, contracts, or vouchers, or other official documentation evidencing in proper detail the nature and propriety of the charges. All checks, payrolls, invoices, contracts, vouchers, orders, or other accounting documents pertaining in whole or in part to this Contract shall be clearly identified and readily accessible.

Reports and Information

At such times and in such forms as the Federal Agency or the City may require, there shall be furnished to the Federal Agency or the City such statements, records, data and information as the Federal Agency or the City may request pertaining to matters covered by this Contract.

Audits and Inspection

At any time during normal business hours and as often as the City, the Federal Agency and/or the Comptroller General of the United States may deem necessary, there shall be made available to the City, the Federal Agency and/or representatives of the Comptroller General for examination of all its records with respect to all matters covered by this Contract and will permit the City, the Federal Agency and/or representative of the Comptroller General to audit, examine and make excerpts or transcripts from such records, and to make audits of all contracts, invoices, materials, payrolls, records of personnel, conditions of employment, and other data relating to all matters covered by this Contract.

Section 7

Conflict of Interest and Lobbying

(A) **Interest of Members, Officers, or Employees of the City, Members of Local Governing Body, or Other Public Officials.** No member, officer, or employee of the City, or its designees or agents, or member of the governing body of the City, during his/her tenure of for one year thereafter, shall have any interest, direct or indirect in any contract or subcontract, or the proceeds thereof, for work to be performed in connection with the Project assisted under this Contract. Any contract in which any of the above indicated individuals becomes directly or indirectly, interested, personally or as a member of a firm, or as an officer, director, or stockholder of a corporation, shall be and become absolutely void; and any money which shall have been paid on such contract by the City may be recovered back from any or all persons interested therein, by a joint action or several actions.

(B) The Contractor agrees that he will incorporate into every contract required to be in writing the following provisions: **Interest of Contractors and Employees** - The Contractor covenants that he presently has no interest and shall not acquire any interest, direct or indirect, in the Project which would conflict in any manner or degree with the performance of this Contract, and no person having any conflicting interest shall be employed. Any interest on the part of the Contractor or his employees must be disclosed to the Federal Agency and the City. Provided, however, that this paragraph shall be interpreted in such a manner so as not to unreasonably impede any statutory requirements that opportunity be provided for employment of and participation by certain residents of a designated geographical are, if applicable.

(C) **Interest of Member or of Delegate to Congress.** No member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

(D) The Contractor by signing this document certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the Contractor shall complete and submit Standard Form -LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

The above certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1332, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(E) The parties to this Contract certify and agree that they are under no contractual or other disability which would prevent them from complying with the terms of this Contract.

Section 8

Labor Standards - Physical Improvement Projects

Where applicable, there shall be included in all construction, rehabilitation, alteration or repair contracts with private entities made possible by or resulting from this Contract, the following Labor Standards provisions;

(A) General Requirements.

(1) **Subcontracts.** The Contractor shall include in any subcontract the clauses set forth in Section 8, **Labor Standards**, in their entirety and also a clause requiring the subcontractors to include these clauses in any Tower tier subcontract which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

(2) The transporting of materials and supplies to or from the site of the Project or Program to which this Contract pertains by the Employees of the Contractor or of any subcontractor, and the manufacturing or furnishing of materials, articles, supplies, or equipment on the site of the Project or Program to which this Contract pertains by persons employed by the Contractor or by any subcontractor, shall for the purpose of this Contract, and without limiting the generality of the foregoing provisions of this Contract, be deemed to be work to which these **Labor Standards** provisions are applicable.

(3) No person under the age of eighteen years shall be employed on work covered by this Contract.

(4) In connection with the performance of work under this Contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment except as provided by Public Law 89-176, September 10, 1955 (18 U.S.C. 4082 (c) (2)) and Executive Order 11755, December 29, 1973.

(5) The Contractor will permit authorized representatives of the Federal Agency and the City to interview employees during working hours on the job.

(6) No employee to whom the wage, salary, or other **Labor Standards** provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the Labor Standards applicable under this Contract to his employer.

(B) **Safety Standards.** No Contractor or subcontractor contracting for any part of a construction contract shall require any laborer or mechanic, including apprentices and trainees, employed in the performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to his

health or safety, as determined under construction safety and health standards promulgated by the Secretary of Labor. The Contractor or subcontractor comply with all the rules, regulations, and relevant orders, promulgated by the Secretary of Labor pursuant to Public Law 91-54.

(C) **Davis-Bacon Act - 29 CFR 5.5**

Refer to Section 10, Page 9

Housing and Urban Development (HUD) form-4010 (07/2003) Ref Handbook 1344.1

City of Duluth “Mini Davis-Bacon”

(D) **City of Duluth - Minimum Wage Ordinance 8940, as Amended.**

(1) On a project (as defined below) funded in whole or in part by federal and/or state funds, these local provisions shall prevail in those instances where the requirements of the local provisions are equal to or greater than similar minimum labor standards provisions as set forth in applicable federal and/or state laws and regulations.

(2) In all contracts in excess of \$2,000 for projects (as defined below), the Contractor’s particular attention is called to Ordinance 8940, effective June 8, 1989, respectively coded as Article IV of Chapter 2 of the Duluth City Code, and entitled “An Ordinance Pertaining to Wages and Working Hours of Persons on Public Works in the City of Duluth”, as set forth below:

(3) **Definitions.**

For the purposes of this section the following words and phrases shall have the meanings respectively ascribed to them in this section:

(a) **Basic hourly rate.** - The hourly wage paid to any employee.

(b) **Prevailing wage rate.** - The basic hourly rate plus fringe benefits prevailing in the city of Duluth as determined by the United States secretary of labor pursuant to the Davis-Bacon act, as amended; provided that whenever employer and employee organizations employing and representing a majority of a class of workers in a particular industry within the city jointly certify that the prevailing basic hourly rate plus fringe benefits of such workers differs from the amount determined by the secretary of labor, the certified rate shall be considered to be the prevailing wage rate for such class of workers in that industry.

(c) **Fringe benefits.** - Employer contribution for health and welfare benefits, vacation benefits, pension benefits, and all other economic benefits other than the basic hourly rate.

(d) **Apprentice** - An employee who is working under a training program which is approved either by the U.S. Department of Labor Bureau of Apprenticeship & Training or the Minnesota Director of Voluntary Apprenticeship; see apprentice ratios on page 22 and HUD 4010 in Section 10..

(e) **Trainee** - An employee registered with the U. S. Department of Labor Employment & Training Administration; see HUD 4010 in Section 10.

(f) **Project.** - Erection, construction, demolition, painting, remodeling or repairing of any public building, highway, sidewalk, bridge, water or gas line, sewer and sewage treatment facility or other public work performed under contract with the city.

(g) **Labor, mechanic.** - All persons utilized, employed or working on a project who are doing work usually done by mechanics and laborers, including proprietors, partners, and members of cooperatives.

(4) **Wage Rates and Hours for City of Duluth Projects.**

(a) Any contract which provides for a project of estimated total cost of over \$2,000.00 shall contain a stipulation that no laborer, mechanic or apprentice-trainee employed directly upon the project work site by the contractor or any subcontractor shall be permitted or required to work at a rate of pay less than the prevailing wage rate; nor shall any such employee be permitted or required to work more than 8 hours in any work day or 40 hours in any work week unless he is paid at a rate of at least 1½ times the basic hourly rate for all hours in excess of 8 per day or after 40 per week and unless he receives fringe benefits that are at least equal to those in the prevailing wage rate; provided that whenever employer and employee organizations employing and representing a majority of a class of workers in a particular industry within the city jointly certify that the maximum number of hours that such persons may work under existing labor agreements before overtime wages must be paid differs from the hours specified in this paragraph, the maximum number of hours specified in such labor agreements shall be substituted for those specified above in applying the provisions of this paragraph to such workers.

(b) The word “or” in the state statute and the City of Duluth Code refers to the number of hours worked in any one week or, in the alternative, the number of hours worked in any one day in the week (the days in one week being totaled for reporting purposes); the law requires use of the alternative which results in the higher number of overtime hours for each employee whose time is being reported. All hours exceeding 40 per week are subject to overtime in addition to the daily overtime requirements.

EXCEPTIONS: Federal government funding only and HUD (Housing and Urban Development) funding - see point “e”

In summary, if a project is solely funded with City of Duluth monies, the City allows the employees to work four ten-hour days and be paid at the regular hourly rate for those ten hours; exceeding hours must be paid at the overtime rate. An employer may not withhold overtime payment exclusively until 40 hours per week have been worked. Daily overtime must be paid as it is earned.

● **The base workweek hours must be clearly indicated on each payroll. Employees may be assigned a different workweek; however, that must be clearly marked beside the employees’ names.**

The following are examples of how these rules apply to different situations.

TT refers to the total time worked on the day or in the week

RT refers to the hours worked at the regular rate of pay (straight time)

OT refers to the hours worked for which overtime must be paid

	State Funded with or without federal funding Projects							City-only Funded Projects (4 ten-hour days)						
	Mon	Tues	Wed	Thurs	Fri	Sat	Total	Mon	Tues	Wed	Thurs	Fri	Sat	Total
TT	10	10	10	10	0	6	46	10	10	10	10	0	6	46
RT	8	8	8	8	0	6	38	10	10	10	10	0	0	40
OT	2	2	2	2	0	0	8	0	0	0	0	0	6	6

	State Funded with or without federal funding Projects							City-only Funded Projects (4 ten-hour days)							
	Mon	Tues	Wed	Thurs	Fri	Sat	Total		Mon	Tues	Wed	Thurs	Fri	Sat	Total
TT	0	10	10	0	7	0	27		10	0	12	0	0	0	32
RT	0	8	8	0	7	0	23		10	0	10	10	0	0	30
OT	0	2	2	0	0	0	4		0	0	2	0	0	0	2

(c) Overtime Calculations

Minnesota Statutes Chapter 177.42, subd 4 specifies that the prevailing hours of labor may not be more than eight hours per day or more than 40 hours per week (as stated above in (b), the City of Duluth does allow for ten hours per day/40 hours per week with City funding *only*).

Minnesota Statutes Chapter 177.42, subd 5 defines the hourly basic rate as the hourly wage paid to any employee. (subd 6): The prevailing wage rate means the hourly basic rate of pay plus the contribution for health and welfare benefits, vacation benefits, pension benefits, and any other economic benefit paid to the largest number of workers engaged in the same class of labor within the area...

Minnesota Statutes Chapter 177.43, subd 1 (1) ...employees are permitted to work more hours than the prevailing hours of labor [being] paid for all hours in excess of the prevailing hours at a rate of at least 1-½ times the hourly basic rate of pay. (2) A laborer or mechanic may not be paid a lesser rate of wages than the prevailing wage rate in the same or most similar trade or occupation in the area.

An employer may pay a lower hourly rate and higher fringe benefit rate--to a bona fide plan--than stated in the wage decision providing the total of the two rates is equal to or greater than the total in the wage decision.

Overtime Calculation with Fringe Benefits Paid to Bona Fide Plans

For overtime purposes, an employer paying higher fringe benefits to a bona fide plan and paying a lower hourly rate MUST calculate the overtime on the higher hourly rate as stated in the contract's wage decision.

Overtime Calculation with Cash Payment of Fringe Benefits

When the fringe benefit is paid directly to an employee, the prevailing base rate and the fringe benefit rate for a specific classification are totaled to arrive at the hourly rate. *Overtime is calculated (1.5 x) the base rate with the fringe benefit amount added to that rate: base rate x 1.5 + fringe benefit rate = overtime rate.*

(d) A contractor shall not reduce a worker's private, regular rate of pay when the wage rate certified by the U. S. Department of Labor or the Minnesota Department of Labor & Industry is less than the worker's normal hourly wage [Minnesota Statute 181.03 subdivision 1(2)].

(e) Regular Time & Overtime Definitions

- **State of Minnesota** funded projects with or without federal funding *only allow for five eight-hour days per week at regular time.* Overtime is calculated at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.
- **City of Duluth** funded projects do permit four ten-hour work days at regular time--see point 4-a, b for stipulations. Overtime is calculated at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.
- **Federal** funded only projects allow overtime pay for hours worked in excess of 40 in a workweek at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.
- **HUD** funded projects allow overtime pay for hours worked in excess of 40 in a workweek at a rate not less than time and one-half (1.5) of the prevailing base rate as stated in the wage decision--OR the base rate the employee is being paid if it is higher than the required base rate--plus the straight time fringe benefit amount.

(f) The minimum hourly prevailing wages are contained in each project specification. When both federal (general decision rates from the U. S. Department of Labor) and State of Minnesota prevailing wages for state funded construction projects from the Minnesota Department of Labor and Industry are used, the prime contractor and all subcontractors including trucking operations, are required to pay the higher of the two wages for all laborers and mechanics [MnDOT Contract Administration Manual, Section 5-591.320].

(g) The prime contractor and any lower-tier subcontractor shall review all wage decisions and compensate a worker according to the type of work performed and at the rate that is the greatest.

(h) State of Minnesota prevailing wages typically list two rates for each classification with two effective dates. Should any City of Duluth contract continue to and past the second effective date, that rate and fringe benefit will be in effect through the remainder of the project.

(i) All contracts for city projects shall have applicable schedules of prevailing wage rates set forth in the contract. Schedules of applicable prevailing wage rates shall be present on all project job sites and shall either be posted on the site or be on the person of any supervisor in charge of the job site.

(j) Employees on projects shall be paid at least weekly. Fringe benefits shall be paid either in cash or to an employee benefit plan that has been approved by the U.S. Department of Labor.

■ The fringe benefit package is an integral portion of the prevailing wage. Should the prime contractor become delinquent with any fringe benefit plan administrator's requirements for monthly payment, an estimated amount due that plan plus penalties will be withheld from the monthly estimate(s). This also pertains to subcontractors; their fringe plan payment delinquency will affect the monthly estimate(s) in the same manner. See MnDOT Specification 1906 on page eight.

See Statement of Compliance and Certified Payroll Report requirements in Section 10, HUD 4010 and web sites in Section 14, Forms.

(k) Any contractor or subcontractor working on a project shall furnish the City with **original** certified payroll reports with **original signatures** relating to the project. Such certified payroll reports shall be **submitted weekly** on U.S. Department of Labor standard forms (WH-347) or their equivalent--using the same format--to the City of Duluth Labor Standards representative. All City of Duluth funded projects must have the base workweek hours indicated on the

certified payroll form and/or beside each employee's name (should some employees be working different base workweeks).

(l) No contractor or subcontractor working on a project shall evade or attempt to evade the provisions of this section through the use of non-recognized training programs. The only employees involved in training programs that shall be allowed to work on projects covered by this section shall be apprentice-trainees as defined by this article.

(m) Any person violating the provisions of this section shall be guilty of a misdemeanor with each day of violation constituting a separate offense. In addition, if the prevailing wage rate and accompanying fringe benefit rate is not paid to employees working on a project, the City of Duluth may withhold contract payments to the prime contractor until such deficiencies are corrected. Should fringe benefits be paid to authorized Plans, the payments must be made within the demands of those Plans. Delinquencies may result in withholding of project funds to the prime contractor.

(n) This section shall not apply to contracts for projects where the total cost of the project is less than \$2,000.00; nor to materialmen who do no more than deliver materials to the work site, except that this section shall apply to employees who deliver asphalt, concrete or mineral aggregate such as sand, gravel or stone where such material is incorporated into the project by depositing the material substantially in place, either directly or through spreaders, from the transporting vehicle.

(5) **Helpers**

A helper may perform work only if the helper classification is specified and defined in the federal wage decision and/or State of Minnesota wage decision incorporated into the project contract. Without such a helper classification, the contractor must assign a job classification that is the "same or most similar" [Minnesota Statute 177.44, subdivision 1] and compensate the helper for the actual work performed regardless of the helper's skill level.

(5) **Apprentice Ratios**

Journeyworkers must be on site with the apprentices and their hours must match.

FUNDING SOURCE:

City of Duluth and State of Minnesota with or without Federal funding

(i) Apprentices are not permitted to work alone under any circumstances.

(ii) Working foremen are acceptable as a journeyworker PROVIDING he/she is in the same classification.

» Example: carpenter foreman and carpenter apprentice

• Ratios are determined by the trade's labor agreement.

• In the absence of ratio language, the following State of Minnesota apprenticeship ratios will be applied:

(apprentice:journeyworker) 1:1 2:4 3:7 4:10, etc.

• Employees working in excess of the allowable ratio must be paid the full journeyworker compensation.

• Out-of-ratio apprentices will be calculated beginning with the **apprentice at the highest level of training** and, then, to less senior apprentices in their rank order.

• Should two or more out-of-ratio apprentices have the same level of training, whomever was on the work site first will receive journeyworker pay; if the apprentices at the same level of training began work on the project site at the same time, hours worked out-of-ratio for which restitution is due will be divided among those apprentices.

Examples:

Four apprentices working unsupervised are on site. [4:0]

Ratio calls for four apprentices and ten journeyworkers [4:10]

Correction: all apprentices will receive the full journeyworker compensation as apprentices are not permitted to work alone.

Three apprentices and two journeyworkers are on site. [3:2]

Ratio calls for three apprentices and seven journeyworkers [3:7]

Two journeyworkers may accompany only one apprentice; therefore, the two highest level apprentices are paid the full journeyworker compensation.

Even though this particular job has three apprentices—the second journeyworker is a mute point; a third journeyworker would also be a mute point in this example.

Correction: the two highest level apprentices are paid the full journeyworker compensation and the third lower level apprentice is considered in ratio.

HUD (CDBG) and Federal funding only

• Apprentices are not permitted to work alone unless the U. S. Department of Labor-approved agreement allows that practice.

• Working foremen are acceptable as a journeyworker PROVIDING he/she is in the same classification.

» Example: electrician foreman and electrician apprentice

• Ratios are determined by the trade's U. S. Department of Labor-approved agreement.

• In the event of the absence of ratio language in the applicable agreement, the Minnesota Department of Labor ratio of one apprentice for the first journeyworker and one apprentice for each three journeyworkers thereafter will be applied, (i.e., 1:1, 2:4, 3:7, 4:10, etc.).

• **The legal apprentices are those who first came to work on the job site;** in the event that all apprentices begin work on the project site at the same time, hours worked out-of-ratio for which restitution is due will be divided among the apprentices.

• Time cards will be required to substantiate the start times.

• Employees working in excess of the allowable ratio--or for which U. S. Department of Labor-apprentice agreement/certificate is not provided--must be paid the full journeyworker compensation.

Examples:

Four apprentices and one journeyworker are on site. [4:1]

Ratio calls for four apprentices and ten journeyworkers. [4:10]

The first apprentice on site is considered in ratio as one journeyworker may only accompany one apprentice [1:1]; this particular job has four apprentices.

Correction: the second through the fourth apprentices coming on site are paid the full journeyworker compensation.

Six apprentices and two journeyworkers are on site [6:2]

Ratio calls for six apprentices and sixteen journeyworkers [6:16]

The first apprentice on site is considered in ratio as two journeyworkers may only accompany one apprentice; this particular job has six apprentices—the second journeyworker is a mute point.

Correction: the second through sixth apprentices coming on site are paid the full journeyworker compensation.

(6) **Poster Boards**

The prime contractor must construct and display a poster board, which contains all required posters, is legible and is accessible to all workers from the first day of work until the project is 100% complete. Prime contractors are not allowed to place a poster board at an off-site facility location.

(7) **Trucking Issues**

a) For the purpose of sections seven and eight, the term “owner” includes all persons having an ownership interest in the trucking entity or a partnership interest in the trucking entity and has a legal and rightful title to the vehicle(s) or has an approved lease on the vehicle(s). “Operate” means the owner either physically drives the vehicle or hires another to physically drive the vehicle, yet maintains the right to direct the day-to-day operations of the vehicle.

b) Trucking Operations Definitions:

Independent Trucking Operator: an individual or partnership who owns or holds a vehicle under lease and who contracts that vehicle and the owner’s services to an entity which provides construction services to a public works project. The individual owns or leases and drives the equipment, is responsible for the maintenance of the equipment, bears all operating costs, determines the details and means of performing the services, and enters into a legally binding agreement that specifies the relationship to be that of an independent contractor and not that of an employee.

Multiple Truck Operations: any legal business entity that owns more than one vehicle and hires the vehicles out for services to brokers or contractors on public works projects. The owners of a trucking firm may either drive the vehicles or hire employees to drive the vehicles. Employee drivers are subject to the appropriate prevailing wage rate. The owner driving a vehicle is obligated to account for the value of his/her services as a driver at the appropriate prevailing wage.

Partnerships: a legal business entity where two or more individuals hold vehicles under lease and contract those vehicles and their services to an entity which provides construction services to a public works project. The partners own or lease the equipment, are responsible for maintenance and all operating costs, drive the equipment, determine the details and means of performing the services, and enter a legally binding agreement that specifies the relationship to be that of a partner and not that of an employee. All partners are subject to the appropriate prevailing wage.

Corporation: any legal business entity that owns or leases vehicles to provide construction services to public works projects. All individuals are employees of the corporation and subject to the appropriate prevailing wage regardless of title or position.

Broker: an individual or firm who (activities include, but are not limited to):

- contracts to **provide** trucking services [equipment and driver] in the construction industry to users of such services, such as prime contractors and various subcontractors of the prime;
- contracts to **obtain** services from other trucking operations and dispatches them to various assignments;
- receives payment from the users (such as prime contractors and various subcontractors) in consideration for the trucking services provided; and
- makes payment to the providers (trucking operations so contracted with) for their services.

(8) **Specific documentation from trucking operations.**

Independent Trucking Operators

The owner/operator of a truck must submit a copy of his/her commercial driver’s license (CDL), cab card, and insurance certificate for each truck the owner/operator drives on each construction project *before commencing work on that project*. These documents must be sent to the prime contractor who will then forward the material to Labor Standards, Engineering Division at the City of Duluth.

Multiple Truck Operators

Weekly certified payrolls and payment of corresponding prevailing wages plus the fringe benefit package will be required for each project where trucks are operating. This covers the owner plus all employees performing work on the project.

Partnerships

Weekly certified payrolls and payment of corresponding prevailing wages plus fringe benefit packages will be required for each project where trucks are operating. This covers all partners of the organization who perform work on the project.

Each partner performing work on a project must submit a copy of his/her commercial driver’s license (CDL), cab card, and insurance certificate for the truck being operated with that weekly certified payroll. It is not necessary to repeat such supporting documentation until a different truck is used and/or certificates or licenses have expired.

Employees of the partnership are always reported on a weekly certified payroll and paid the appropriate prevailing wage plus fringe benefit package for the work being performed.

Corporations

All persons employed by the corporation are subject to receive payment of the prevailing wage plus the fringe benefit package for the work performed on a project regardless of title or position. Weekly certified payrolls must be submitted for all work performed on the project.

Brokers

Truck ownership and a **bonafide contract** between the broker and another trucking operation, a prime contractor, or a subcontractor must be identified. Paperwork must be submitted with the month end trucking report to the City of Duluth Labor Standards representative - Engineering. Certified payrolls are not required when the above documentation is provided and approved.

(10) **Month End Trucking Report - ONLY REQUIRED WITH STATE OF MINNESOTA FUNDING**

The Minnesota Department of Transportation Month End Trucking Report (Mn/DOT TP-90550 7-05) and Minnesota Department of Transportation Month End Trucking Report Statement of Compliance (Mn/DOT TP-90551 7-05) are *only required on state funded projects*.

A guide for completing the forms including definitions and the reports, themselves, may be downloaded from:

www.dot.state.mn.us/const/labor/truckinginfo.html

Payment to the prime contractor may be withheld until documentation is received and approved.

(11) **Truck Rental Rates - ONLY REQUIRED WITH STATE OF MINNESOTA FUNDING**

Truck rental rates are listed in the prevailing wage section of the project specifications/contract.

(12) **Minnesota Rules 5200.1105 and 5200.1106**

These rules are incorporated into this supplementary general conditions by reference and are found on this web site:

www.revisor.leg.state.mn.us/rules/?id=5200

(13) **Truck Axles**

Per Minnesota Rules 5200.1100 Master Job Classifications, a truck “unit” refers to all axles including the steering axle.

A tag axle is also counted as one of the axles.

Examples: four rear axles plus one steering axle = five axles total
one rear axle plus one steering axle = two axles total

(14) **Non-Compliance and Enforcement**

- a) The prime contractor shall be liable for any unpaid wages to its workers or those of its lower-tier subcontractors, trucking companies/Multiple Truck Owners (MTO's) and/or Independent Truck Owner/Operator (ITOs) [MnDOT Standard Specifications for Construction, Section 1801].
- b) See Section 9, MnDOT Specification 1906 Partial Payments.

(15) **IC-134 form - Withholding Affidavit for Contractors**

The IC-134 form will be required from all Multiple Truck Operators, Partnerships, and Corporations performing trucking services on a project before the retainage or all remaining funds can be released. Web site for completing form online: www.mndor.state.mn.us
The form, itself, is found at: www.taxes.state.mn.us/forms/ic134.pdf

(16) **Owners, Supervisors, Foremen listed on certified payrolls.**

All persons working on a City of Duluth project including owners, partners, supervisors, salaried persons, and working foremen who perform laborer and/or mechanic work shall be reported on the weekly certified payroll reports including all data required of any laborer or mechanic. (ordinance 8731, 6/24/85)

(17) **Supporting documentation.**

At his/her discretion, the City of Duluth Labor Standards representative may demand proof of payment of the prevailing wage which may include copies of a payroll register, itemized time sheet and matching cancelled check, or any other supporting documents as stipulated. Payment to the prime contractor may be withheld until documentation is received and approved.

(18) **Kickbacks from Public Works employees prohibited.**

No contractor working on a project or other person shall, by force intimidation, or threat of termination of employment, cause any employee working on a project to give up any part of the compensation to which he is entitled under his contract of employment.

Section 9

**Minnesota Department of Transportation Specification 1906 Partial Payments
Process For "Withholding Contract Monies" and "Default and Termination of a Contract" 11/5/04**

Mn/DOT Specification 1906 Partial Payments describes the Commissioner's authority to withhold funds to protect the Department's interests. In addition, Specification 1808 Default and Termination of a Contract describes the Commissioner's authority to take the prosecution of the work out of the hands of the Contractor.

Additionally, on projects funded in whole or part with federal funds and in accordance with the Required Contract Provisions Federal-Aid Construction Contracts Form – 1273, Section IV, Subpart 6, "Withholding", incorporated into federal aid contracts, the Contracting Officer may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance or guarantee of funds until such violations have ceased.

However, the Department must give the Contractor, and it's Sureties due notice prior to exercising these authorities. The withholding of contract funds, in accordance with Specification 1906 or the Required Contract Provisions Federal-Aid Construction Contracts Form – 1273, Section IV, Subpart 6, "Withholding", should be implemented as soon as a possible prevailing wage violation is recognized. However, Default and Termination of a Contract, in accordance with Specification 1808, should only be exercised as a "last resort" if the Contractor is not willing to comply.

Definitions

(Mn/DOT Standard Specifications for Construction 2000 Edition, Section 1103)

Commissioner: The Commissioner of the Minnesota Department of Transportation, or the chief executive of the department or agency constituted for administration of Contract work with its jurisdiction.

Contractor: The individual, firm or corporation Contracting for and undertaking prosecution of the prescribed work; the party of the second part to the Contract, acting directly or through a duly authorized representative.

Department: The Department of Transportation or the State of Minnesota, or the political subdivision, governmental body, board, commission, office, department, division, or agency constituted for administration of the Contract work within its jurisdiction.

(Form 1273 - 29 CFR, Part 5.1, Definitions)

Contracting Officer: The individual, a duly appointed successor or authorized representative who is designated and authorized to enter into Contracts on behalf of the Federal Agency and/or the City of Duluth.

Important Considerations

1. Upon completion of the work under a contract, the department should consider issuing the final voucher as soon as possible. Failure to finalize a contract expeditiously could result in subsequent claims that would prevent the department from finalizing the contract. However, before the issuance of the final voucher, the department must be able to ensure that the terms of the contract have been satisfied. Failure on the part of the department to ensure compliance could result in the Mn/DOT state aid division retaining funds from the department in accordance with *Minnesota Rules 8820.3000, subpart 5*.
2. On every contract, the department should withhold the final retainage in accordance with the following guidelines: (1) if the total amount of the contract is \$1,000,000 or more, the department should retain funds not more than \$50,000, (2) if the total amount of the contract is less than \$1,000,000, the department should retain 5% of the total contract, (3) retainage should be withheld until the department can ensure that the contractor has met the terms of the contract or until the finalization of the contract.
3. This guide specifies that the department verbally notify the bonding company early in the process. Generally, as a "rule of thumb", notifying the bonding company is usually the "last resort". However, the justification for the early notification is related to the language found in *Minnesota statute 574.31, subdivision 2*, which summarizes that if an individual or the department does not submit a claim on the payment bond within 120 days after the completion of work under the contract, the claim can be denied.

The following are general guidelines that should be followed prior to placing a Contractor in default:

Step 1: Upon verbal or written notification that a possible prevailing wage violation exists, the Department should give written notice to the Contractor regarding the nature of the claim, along with the Department's intent to withhold monies until the claim is investigated and determined to be in compliance. Additionally, the Department should inform the Contractor that the bonding company has been verbally notified of the claim. Please be aware, the Department should ensure employee confidentiality at all times.

Upon a preliminary determination surrounding the financial extent of the claim, the Department should consider retaining a "reasonable" portion of one or more partial estimates in accordance with Mn/DOT's 2000 Standard Specifications for Construction, Section 1906; or on federal aid contracts, in accordance with the Required Contract Provisions Federal-Aid Construction Contracts Form – 1273, Section IV, Subpart 6, "Withholding".

If it is determined that the claim is valid, the Department should schedule a meeting with the Contractor and attempt to resolve the matter. If the claim is determined to be invalid, the Department should release any partial estimates that may have been held as a result of the claim. However, the Department should continue to withhold the final retainage in accordance with the above-mentioned: Important Considerations, 2.

Step 4: If resolution cannot be obtained through a meeting, the Department should order the Contractor, in writing, to complete their obligations under the contract. The letter should clearly state the circumstances under which the Department has deemed that the Contractor has not met the terms of the contract.

Additionally, the Department should include a reasonable deadline for this obligation to be completed. A copy of this letter should be forwarded to the Surety, District State Aid Engineer (DSAE), Labor Compliance Unit and the Department's Attorney.

- Step 5: In the event that the Contractor does not respond to the Department's written order, the Department should send a similar letter, requesting that the Contractor respond immediately, in writing, regarding the Contractor's intention to comply or not comply with the order. A copy of this letter should be forwarded to the Surety, District State Aid Engineer (DSAE), Labor Compliance Unit and the Department's Attorney.
- Step 6: If the Department still does not get a proper response from the Contractor, the Department should write another letter, addressed to both the Contractor and the Surety, specifying all the facts of the alleged breach, demanding that the Contractor, or its Surety, respond satisfactorily within 10 days or the Department may exercise its authority to Default and Terminate the Contract in accordance with/DOT's 2000 Specifications for Construction, Section 1808. It's important to provide sufficient detail so that the Surety understands the situation. This notification should be sent by certified mail. A copy of this letter should be forwarded to the Surety, District State Aid Engineer (DSAE), Labor Compliance Unit and the Department's Attorney.
- Step 7: If the Contractor or Surety is unresponsive after 10 days, the Department should consult with their attorney to consider proceeding with Default and Termination of the Contract.
- Step 8: Upon termination of the contract, the Department provides a written order to the Surety, requiring the Surety to bring resolution to the prevailing wage violation.
- Step 9: The Department places the Contractor on a Non-Responsible Bidder's List and rejects any future awards.

Section 10

Federal Labor Standards Provisions / U.S. Department of Housing and Urban Development Office of Labor Relations

Previous editions are obsolete

HUD-4010 (06/2009) ref. Handbook 1344.1

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of

the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. **Instead, the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number).** The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site.

The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to, and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of

progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

Section 11

Equal Opportunity Laws and Regulations

(A) In addition to Contract specifications set forth below, the Contractor shall conduct and administer this Contract in compliance with:

- (1) Title VI of the Civil Rights Act of 1964 (Pub. L. 88-352) and implementing regulations issued at 24 CFR Part 1;
- (2) Title VIII of the Civil Rights Act of 1968 (Pub. L. 90-284), as amended, and implementing regulations;
- (3) Section 109 of the Housing and Community Development Act of 1974, as amended; and the regulations issued pursuant thereto (24 CFR Section 570.601);
- (4) Section 3 of the Housing and Urban Development Act of 1968, as amended, and implementing regulations of 24 CFR Part 135;
- (5) Executive Order 11246, as amended by Executive Order 11375 and 12086 and implementing regulations at 41 CFR Chapter 60;
- (6) Executive Order 11063, as amended by Executive Order 12259 and implementing regulations at 24 CFR Part 107;
- (7) Section 504 of the Rehabilitation Act of 1973 (Pub. L. 93-112), as amended, and implementing regulations when published for effect;
- (8) The Age Discrimination Act of 1975, as amended, (Pub. L. 94-135) and implementing regulations when published for effect;
- (9) The Minnesota Human Rights Act of 1974, as amended (Chapter 363).

Equal Opportunity and Affirmative Action

(A) Contractors and Subcontractors that have a work force in excess of fifty (50) employees and a contract in excess of \$50,000.00 shall prepare and maintain an appropriate affirmative action plan in accordance with the provisions of 41 CFR 60 "Compliance Responsibility for Equal Opportunity".

(B) Non-segregated Facilities. The Contractor shall certify that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The Contractor covenants that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. As used in this paragraph the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, creed, religion, national origin, ancestry, age, marital status, status with respect to public assistance, and/or disability because of habit, local custom, or otherwise.

General Provisions Against Discrimination

(A) In all hiring or employment made possible by or resulting from this Contract, there:

- (1) will not be any discrimination against any employee or applicant for employment because of race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability.
- (2) affirmative action will be taken to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability. This requirement shall apply to, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. There shall be posted in conspicuous places available to employees and applicants for employment, notices setting forth the provisions of this clause. All solicitations or advertisements for employees shall state that all qualified applicants will receive consideration for employment without regard to race, color, creed, religion, national origin, ancestry, age, sex, marital status, status with respect to public assistance, and/or disability.

(B) No person in the United States shall, on the grounds of race, color, creed, religion, national origin, age, sex, marital status, status with respect to public assistance, and/or disability, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity made possible by or resulting from this Contract. The Contractor and each employer will comply with all requirements imposed by or pursuant to the regulations of the Federal Agency effectuating Title VI of the Civil Rights Act of 1966. The Contractor will note this requirement in all solicitations or advertisements for employees. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(C) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the Contractor's commitments under these provisions, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(D) The Contractor hereby agrees that he will incorporate into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained pursuant to this Contract, the equal opportunity clause which is a part of these Contract Documents.

(E) The Contractor further agrees that he will be bound by the equal opportunity clause and other provisions of 41 CFR Chapter 60, with respect to his own employment practices when he participates in federally assisted construction work: **Provided:** That of the Contractor so participating is a State or Local Government, the above equal opportunity clause is not applicable to any agency, instrumentality, or subdivision of such government which does not participate in work on or under the Contract. Also, the Contractor will make his files available to inspection by appropriate government agencies and shall furnish those reports as may be required by said agencies.

(F) The Contractor agrees that he will assist and cooperate actively with the Federal Agency and the Secretary of Labor in obtaining the compliance of subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that he will furnish the Federal Agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that he will otherwise assist the Federal Agency in the discharge of its primary responsibility for securing compliance.

(G) The Contractor further agrees that he will refrain from entering into any contract or any contract modification subject to Executive Order 11246 of September 24, 1965, with a subcontractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order. In addition, the Contractor agrees that if he fails or refuses to comply with these undertakings, the City or the Federal Agency may take any or all of the following actions: Terminate or suspend in whole or in part this Contract; refrain from extending any further assistance to the Contractor under the Project with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received from such Contractor and refer the case to the Department of Justice for appropriate legal proceedings.

Affirmative Action - "Construction Contracts" over \$10,000

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity
(Executive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

<u>Timetables</u>	<u>Goals for minority participation (percent)</u>	<u>Goals for female participation (percent)</u>
From April 1, 1980 until revised	3.0	6.9

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the City and to the Director of the Office of Federal Contract Compliance Programs; U.S. Department of Labor, ESA/OFCCP, 16th Floor, 230 South Dearborn Street, Chicago, Illinois, 60604, within 10 working days of award of any construction subcontract and/or subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the contractor and/or subcontractor; employer identification number; estimated dollar amount of the prime contract; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the Contract, the "covered area" is all work under a contract currently held with the City of Duluth, Minnesota.

**Standard Federal Equal Employment Opportunity
Construction Contract Specifications (Executive Order 11246)**

1. As used in these specifications:

- a) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor; or any person to whom the Director delegates authority;
- b) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
- c) "Minority" includes:
 - (iii) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (iv) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (v) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (vi) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notices of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitments and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of officers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, creed, religion, national origin, sex, ancestry, age, marital status, status with respect to public assistance and/or disability.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

Affirmative Action for Handicapped Workers

(applies to contracts in excess of \$2,500)

(A) The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: Employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(B) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(C) In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(D) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

(E) The Contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

(F) The Contractor will include the provisions of this clause in every subcontract or purchase order of \$2,500 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era

(applies to contracts in excess of \$10,000)

(A) The Contractor will not discriminate against any employee or applicant for employment because he or she is a disabled veteran or veteran of the Vietnam era in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified disabled veterans and veterans of the Vietnam era without discrimination based upon their disability or veterans status in all employment practices such as the following: Employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

(B) The Contractor agrees that all suitable employment openings of the Contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the Contractor other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be listed at an appropriate local office of the State employment service system wherein the opening occurs. The Contractor further agrees to provide such reports to such local office regarding employment openings and hires as may be required.

State and local government agencies holding Federal contracts of \$10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service, but are not required to provide those reports set forth in paragraphs (D) and (E).

(C) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment source or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and non-veterans. The listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants, and nothing herein is intended to relieve the Contractor from any requirements in Executive Orders or regulations regarding nondiscrimination in employment.

(D) The reports required by paragraph (B) of this clause shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local office or, where the Contractor has more than hiring location in a State, with the central office of that State employment service. Such reports shall indicate for each hiring location (1) the number of individuals hired during the reporting period, (2) the number of non-disabled veterans of the Vietnam era hired, (3) the number of disabled veterans of the Vietnam era hired, and (4) the total number of disabled veterans hired. The reports should include covered veterans hired for on-the-job training under 38 U.S.C. 1787. The Contractor shall maintain at each hiring location copies of the reports submitted until the expiration of one year after final payment under the contract, during which time these reports and related documentation shall be made available, upon request, for examination by any authorized representatives of the contracting officer of the Secretary of Labor. Documentation would include personnel records respecting job openings, recruitment and placement.

(E) Whenever the Contractor becomes contractually bound to the listing provisions of this clause, it shall advise the employment service system in each State where it has establishments of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these provisions, and has so advised the State system, there is no need to advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(F) This clause does not apply to the listing of employment openings which occur and are filled outside of the 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands.

(G) The provisions of paragraphs (B), (C), (D), and (E) of this clause do not apply to openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement for that opening.

(H) As used in this clause:

(1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: Production and non-production; plant and office; laborers and mechanics; supervisory and non-supervisory; technical; and executive, administrative, and professional openings as are compensated on a salary basis of less than \$25,000 per year. This term includes full-time employment, temporary employment of more than 3 days' duration, and part-time employment. It does not include openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement nor openings in an educational institution which are restricted to students of that institution. Under the most compelling circumstances an

employment opening may not be suitable for listing, including such situations where the needs of the Government cannot reasonably be otherwise supplied, where listing would be contrary to national security, or where the requirement of listing would otherwise not be for the best interest of the Government.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(3) "Openings which the Contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) and includes any openings which the Contractor proposes to fill from regularly established "recall" lists.

(4) "Openings which the Contractor proposes to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings which the Contractor proposes to fill from union halls, which is part of the customary and traditional hiring relationship which exists between the Contractor and representatives of his employees.

(I) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

(J) In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations and relevant orders of the Secretary of Labor issued pursuant to the Act.

(K) The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified disabled veterans and veterans of the Vietnam era for employment, and the rights of applicants and employees.

(L) The Contractor will notify each labor union representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Vietnam Era Veterans Readjustment Assistance Act, and is committed to take affirmative action to employ and advance qualified disabled veterans and veterans of the Vietnam era.

(M) The Contractor will include the provisions of this clause in every subcontract or purchase order of \$10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

Section 12 **Employment Opportunities - "HUD Section 3"**

General

These requirements apply to the City of Duluth contracts receiving assistance under the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG) Program.

Type of Covered Projects

24CFR570.607 (b) of the HUD CDBG Program Regulations state in part "... that employment and other economic opportunities arising in connection with housing rehabilitation, housing construction, or other public construction projects shall to the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations be given to low- and very low-income persons.

Thresholds

In accordance with the provisions of 24CFR135.3(a) (3) (ii) (A), the requirements of this Section apply to those recipients as defined at 24CFR135.5 when the amount of this contract exceeds \$200,000.

In addition, in accordance with the provisions of 24CFR135.3 (a) (3) (ii) (B), the requirements of this Section apply to any contractor or subcontractor whose contract exceeds \$100,000 as a result of assistance provided under this contract.

Requirements (Section 3 Clause)

(A) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(B) The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

(C) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement, or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

(D) The Contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

(E) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligation under 24 CFR part 135.

(F) Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD-assisted contracts.

Section 13
Federal Requirements for Minority/Women Business Enterprises Contract Guidance - MPFA

General

Municipalities that receive loan funding must comply with Federal requirements concerning utilization of Minority Business Enterprises (MBE) and Women's Business Enterprises (WBE). These requirements are designed to encourage the prime contractors to utilize MBEs and WBEs whenever procurement opportunities occur.

Regulation

40 C.F.R. Section 35.3145(d) Application of other Federal Authorities, M/WBE Requirements

Executive Orders No. 11625, 12138 and 12432 - Promoting the use of M/WBEs

Section 129 of Public Law 100-590 - Small Business Administration Reauthorization and Amendment Act of 1988

Regulations detailed in the EPA's *Cross-Cutting Federal Authorities - Clean Water Act State Revolving Fund Program and Safe Drinking Water Act State Revolving Fund Program*

Implementation

The "fair share" target percentage participation proposed for this project is 3.5 percent (3.5%) for MBE and 11.5 percent (11.5%) for WBE.

If the Contractor intends to let any subcontractors for a portion of the work, the Contractor shall take affirmative steps to assure that minority and women businesses are utilized when possible as sources of supplies, equipment, construction and services. Affirmative steps shall include the following:

- a) Include qualified minority businesses on solicitation lists.
- b) Assure that minority businesses are solicited whenever they are potential sources.
- c) When economically feasible, divide total requirements into smaller tasks or quantities so as to permit maximum small and minority business participation.
- d) Where the requirement permits, establish delivery schedules, which will encourage participation by minority businesses.
- e) Use the services and assistance of the Office of Minority Business Enterprise of the Department of Commerce.

The low bidder will be required to submit to the City of Duluth documentation of his good faith efforts to meet the targeted goals of utilizing MBEs and WBEs.

Section 14 - Forms

**Minnesota Department of Transportation and City of Duluth, Minnesota
funded certified payroll forms**

- Statement of Compliance Form
www.dot.state.mn.us/const/labor/lcuforms.html
- Certified Payroll Form
www.dol.gov/esa/forms/whd/WH347.pdf

**U. S. Department of Housing and Urban Development and federal
government funded certified payroll forms**

- Statement of Compliance Form & Certified Payroll Forms
www.dol.gov/esa/forms/whd/WH347.pdf
- Fringe Benefit Form - use the second page of the MnDOT Statement of Compliance (form 21658 3/01)
www.dot.state.mn.us/const/labor/lcuforms.html

Minnesota Department of Transportation Trucking Requirements

- Month End Trucking Report
- Month End Trucking Report Statement of Compliance
- Definitions and instructions: www.dot.state.mn.us/const/labor/lcuforms.html

MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE
FUNDED CONSTRUCTION PROJECTS



THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Commercial

County Number: 69

County Name: ST. LOUIS

Effective: 2013-11-18 Revised: 2013-12-06

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

* Indicates that adjacent county rates were used for the labor class listed.

County: ST. LOUIS (69)

LABOR CODE AND CLASS	EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
<i>LABORERS (101 - 112) (SPECIAL CRAFTS 701 - 730)</i>				
101 LABORER, COMMON (GENERAL LABOR WORK)	2013-11-18	22.17	15.36	37.53
102 LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2013-11-18	22.17	15.36	37.53

103	LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2013-11-18	18.00	12.43	30.43
104*	FLAG PERSON	2013-11-18	22.17	15.36	37.53
105*	WATCH PERSON	2013-11-18	19.82	15.36	35.18
106	BLASTER	2013-11-18	22.87	15.36	38.23
107	PIPELAYER (WATER, SEWER AND GAS)	2013-11-18	28.11	15.61	43.72
		2014-05-01	28.61	16.09	44.70
108	TUNNEL MINER	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVVAGE@STATE.MN.US			
109	UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2013-11-18	26.81	15.61	42.42
		2014-05-01	27.31	16.09	43.40
110	SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.	2013-11-18	22.17	15.36	37.53
111	TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	2013-11-18	22.17	15.36	37.53

SPECIAL EQUIPMENT (201 - 204)

201*	ARTICULATED HAULER	2013-11-18	31.37	16.70	48.07
		2014-05-01	31.77	17.20	48.97

202	BOOM TRUCK	2013-11-18	33.83	15.95	49.78
		2014-05-01	34.68	16.45	51.13
203*	LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS	2013-11-18	18.00	12.43	30.43
204	OFF-ROAD TRUCK	2013-11-18	31.37	16.70	48.07
		2014-05-01	31.77	17.20	48.97
205	PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT (ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.	2013-11-18	26.29	14.65	40.94

HIGHWAY/HEAVY POWER EQUIPMENT OPERATOR

GROUP 2 *		2013-11-18	32.22	16.70	48.92
		2014-05-01	32.62	17.20	49.82
306	GRADER OR MOTOR PATROL				
308	TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)				
GROUP 3		2013-11-18	31.67	16.70	48.37
		2014-05-01	32.07	17.20	49.27
309	ASPHALT BITUMINOUS STABILIZER PLANT				
310	CABLEWAY				
312	DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)				
314	DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER				
316	LOCOMOTIVE CRANE OPERATOR				
320	TANDEM SCRAPER				
322	TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)				

GROUP 4		2013-11-18	31.37	16.70	48.07
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- 323 AIR TRACK ROCK DRILL
- 324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS
- 331 CHIP HARVESTER AND TREE CUTTER
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT
- 336 CURB MACHINE
- 337 DIRECTIONAL BORING MACHINE
- 338 DOPE MACHINE (PIPELINE)
- 340 DUAL TRACTOR
- 341 ELEVATING GRADER
- 345 GPS REMOTE OPERATING OF EQUIPMENT
- 347 HYDRAULIC TREE PLANTER
- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER MACHINE
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE
- 356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES
- 357 PUGMILL
- 359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 360 SCRAPER
- 361 SELF-PROPELLED SOIL STABILIZER
- 362 SLIP FORM (POWER DRIVEN) (PAVING)
- 363 TIE TAMPER AND BALLAST MACHINE
- 367 TUB GRINDER, MORBARK, OR SIMILAR TYPE

GROUP 5 *	2013-11-18	18.77	8.18	26.95
370 BITUMINOUS ROLLER (UNDER EIGHT TONS)				
371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)				
372 FORM TRENCH DIGGER (POWER)				
375 HYDRAULIC LOG SPLITTER				
376 LOADER (BARBER GREENE OR SIMILAR TYPE)				
377 POST HOLE DRIVING MACHINE/POST HOLE AUGER				
379 POWER ACTUATED JACK				
381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)				
382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER				
383 SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER				
384 STUMP CHIPPER AND TREE CHIPPER				
385 TREE FARMER (MACHINE)				

GROUP 6	2013-11-18	27.12	16.70	43.82
	2014-05-01	27.52	17.20	44.72
387 CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER				
389 DREDGE DECK HAND				
391 GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)				
393 LEVER PERSON				
395 POWER SWEEPER				
396 SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS				

COMMERCIAL POWER EQUIPMENT OPERATOR

GROUP 1	2013-11-18	36.09	15.95	52.04
	2014-05-01	36.94	16.45	53.39
501 HELICOPTER PILOT (COMMERCIAL CONSTRUCTION ONLY)				
502 TOWER CRANE 250 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
503 TRUCK CRAWLER CRANE WITH 200 FEET OF BOOM AND OVER, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				

GROUP 2 *	2013-11-18	35.75	15.95	51.70
	2014-05-01	36.60	16.45	53.05

504	CONCRETE PUMP WITH 50 METERS/164 FEET OF BOOM AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
505	PILE DRIVING WHEN THREE DRUMS IN USE (COMMERCIAL CONSTRUCTION ONLY)				
506	TOWER CRANE 200 FEET AND OVER (COMMERCIAL CONSTRUCTION ONLY)				
507	TRUCK OR CRAWLER CRANE WITH 150 FEET OF BOOM UP TO AND NOT INCLUDING 200 FEET, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 3		2013-11-18	34.34	15.95	50.29
		2014-05-01	35.19	16.45	51.64
508	ALL-TERRAIN VEHICLE CRANES (COMMERCIAL CONSTRUCTION ONLY)				
509	CONCRETE PUMP 32-49 METERS/102-164 FEET (COMMERCIAL CONSTRUCTION ONLY)				
510	DERRICK (GUY & STIFFLEG) (COMMERCIAL CONSTRUCTION ONLY)				
511	STATIONARY TOWER CRANE UP TO 200 FEET				
512	SELF-ERECTING TOWER CRANE 100 FEET AND OVER MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
513	TRAVELING TOWER CRANE (COMMERCIAL CONSTRUCTION ONLY)				
514	TRUCK OR CRAWLER CRANE UP TO AND NOT INCLUDING 150 FEET OF BOOM, INCLUDING JIB (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 4		2013-11-18	34.00	15.95	49.95
		2014-05-01	34.85	16.45	51.30
515	CRAWLER BACKHOE INCLUDING ATTACHMENTS (COMMERCIAL CONSTRUCTION ONLY)				
516	FIREPERSON, CHIEF BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
517	HOIST ENGINEER (THREE DRUMS OR MORE) (COMMERCIAL CONSTRUCTION ONLY)				
518	LOCOMOTIVE (COMMERCIAL CONSTRUCTION ONLY)				
519	OVERHEAD CRANE (INSIDE BUILDING PERIMETER) (COMMERCIAL CONSTRUCTION ONLY)				
520	TRACTOR . BOOM TYPE (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 5		2013-11-18	33.83	15.95	49.78
		2014-05-01	34.68	16.45	51.13
521	AIR COMPRESSOR 450 CFM OR OVER (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
522	CONCRETE MIXER (COMMERCIAL CONSTRUCTION ONLY)				
523	CONCRETE PUMP UP TO 31 METERS/101 FEET OF BOOM				
524	DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL WHEN USED FOR CAISSON FOR ELEVATOR OR BUILDING CONSTRUCTION (COMMERCIAL CONSTRUCTION ONLY)				
525	FORKLIFT (COMMERCIAL CONSTRUCTION ONLY)				
526	FRONT END, SKID STEER 1 C YD AND OVER				

527	HOIST ENGINEER (ONE OR TWO DRUMS) (COMMERCIAL CONSTRUCTION ONLY)				
528	MECHANIC-WELDER (ON POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
529	POWER PLANT (100 KW AND OVER OR MULTIPLES EQUAL TO 100KW AND OVER) (COMMERCIAL CONSTRUCTION ONLY)				
530	PUMP OPERATOR AND/OR CONVEYOR (TWO OR MORE MACHINES) (COMMERCIAL CONSTRUCTION ONLY)				
531	SELF-ERECTING TOWER CRANE UNDER 100 FEET MEASURED FROM BOOM FOOT PIN (COMMERCIAL CONSTRUCTION ONLY)				
532	STRADDLE CARRIER (COMMERCIAL CONSTRUCTION ONLY)				
533	TRACTOR OVER D2 (COMMERCIAL CONSTRUCTION ONLY)				
534	WELL POINT PUMP (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 6		2013-11-18	32.32	15.95	48.27
		2014-05-01	33.17	16.45	49.62
535	CONCRETE BATCH PLANT (COMMERCIAL CONSTRUCTION ONLY)				
536	FIREPERSON, FIRST CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
537	FRONT END, SKID STEER UP TO 1 C YD				
538	GUNITE MACHINE (COMMERCIAL CONSTRUCTION ONLY)				
539	TRACTOR OPERATOR D2 OR SIMILAR SIZE (COMMERCIAL CONSTRUCTION ONLY)				
540	TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER				
GROUP 7		2013-11-18	31.20	15.95	47.15
		2014-05-01	32.05	16.45	48.50
541	AIR COMPRESSOR 600 CFM OR OVER (COMMERCIAL CONSTRUCTION ONLY)				
542	BRAKEPERSON (COMMERCIAL CONSTRUCTION ONLY)				
543	CONCRETE PUMP/PUMPCRETE OR COMPLACO TYPE (COMMERCIAL CONSTRUCTION ONLY)				
544	FIREPERSON, TEMPORARY HEAT SECOND CLASS BOILER LICENSE (COMMERCIAL CONSTRUCTION ONLY)				
545	OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS AND MILLING MACHINES, OR OTHER SIMILAR POWER EQUIPMENT) (COMMERCIAL CONSTRUCTION ONLY)				
546	PICK UP SWEEPER (ONE CUBIC YARD HOPPER CAPACITY) (COMMERCIAL CONSTRUCTION ONLY)				
547	PUMP AND/OR CONVEYOR (COMMERCIAL CONSTRUCTION ONLY)				
GROUP 8 *		2013-11-18	29.19	15.95	45.14
		2014-05-01	30.04	16.45	46.49
548	ELEVATOR OPERATOR (COMMERCIAL CONSTRUCTION ONLY)				
549	GREASER (COMMERCIAL CONSTRUCTION ONLY)				

550 MECHANICAL SPACE HEATER (TEMPORARY HEAT NO BOILER LICENSE REQUIRED)
(COMMERCIAL CONSTRUCTION ONLY)

TRUCK DRIVERS

GROUP 1 2013-11-18 26.85 14.40 41.25

601 MECHANIC . WELDER

602 TRACTOR TRAILER DRIVER

603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER
OPERATED WINCHES)

GROUP 2 2013-11-18 26.30 14.40 40.70

604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK

GROUP 3 2013-11-18 26.20 14.40 40.60

605 BITUMINOUS DISTRIBUTOR DRIVER

606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)

607 THREE AXLE UNITS

GROUP 4 * 2013-11-18 25.95 14.40 40.35

608 BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)

609 DUMP PERSON

610 GREASER

611 PILOT CAR DRIVER

612 RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS

613 TWO AXLE UNIT

614 SLURRY OPERATOR

615 TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)

616 TRACTOR OPERATOR, UNDER 50 H.P.

SPECIAL CRAFTS

701 HEATING AND FROST INSULATORS 2013-11-18 29.91 22.70 52.61

702 BOILERMAKERS 2013-11-18 32.40 25.37 57.77

703 BRICKLAYERS 2013-11-18 28.85 22.71 51.56

704	CARPENTERS	2013-11-18	27.07	15.98	43.05
705*	CARPET LAYERS (LINOLEUM)	2013-11-18	29.01	14.74	43.75
		2014-06-01	30.07	14.74	44.81
706	CEMENT MASONS	2013-11-18	30.19	16.30	46.49
		2014-05-01	30.69	16.30	46.99
707	ELECTRICIANS	2013-11-18	32.04	23.14	55.18
		2014-06-01	32.54	23.73	56.27
708	ELEVATOR CONSTRUCTORS	2013-11-18	43.57	30.01	73.58
709	GLAZIERS	2013-11-18	26.28	15.42	41.70
710	LATHERS	2013-11-18	27.07	15.98	43.05
712	IRONWORKERS	2013-11-18	29.24	21.20	50.44
714	MILLWRIGHT	2013-11-18	29.32	16.38	45.70
715	PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2013-11-18	28.11	14.97	43.08
716	PILEDRIIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2013-11-18	30.79	17.08	47.87
717	PIPEFITTERS . STEAMFITTERS	2013-11-18	38.41	16.56	54.97
718*	PLASTERERS	2013-11-18	30.82	17.05	47.87
		2014-05-01	31.32	17.05	48.37
719	PLUMBERS	2013-11-18	38.41	16.56	54.97

720	ROOFER	2013-11-18	31.15	14.05	45.20
		2014-07-01	31.95	14.05	46.00
721	SHEET METAL WORKERS	2013-11-18	29.23	20.39	49.62
722	SPRINKLER FITTERS	2013-11-18	32.52	16.87	49.39
		2014-04-01	33.17	17.22	50.39
723	TERRAZZO WORKERS	2013-11-18	29.86	18.20	48.06
724	TILE SETTERS	2013-11-18	23.34	20.13	43.47
725	TILE FINISHERS	2013-11-18	16.15	16.45	32.60
726	DRYWALL TAPER	2013-11-18	28.71	14.87	43.58
727	WIRING SYSTEM TECHNICIAN	2013-11-18	34.16	12.31	46.47
		2014-07-01	35.24	12.31	47.55
728	WIRING SYSTEMS INSTALLER	2013-11-18	23.91	10.27	34.18
		2014-07-01	24.67	10.27	34.94
729	ASBESTOS ABATEMENT WORKER	2013-11-18	27.59	16.01	43.60
		2014-01-01	27.69	16.51	44.20
730	SIGN ERECTOR	2013-11-18	25.44	11.13	36.57

PROJECT LABOR AGREEMENT

NO STRIKE, NO LOCKOUT

PUBLIC SECTOR

CITY OF DULUTH

&

(Name of Contractor)

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AGREEMENT

This Project Labor Agreement (hereinafter, the “Agreement”), is entered into effective the _____ day of _____, 2014, by and between the various contractors engaged in the construction of facilities to be known as the (Project). The parties to this Agreement are the Building and Construction Trades Council, on behalf of its affiliated Local Unions (hereinafter “Union” or “Unions”), the City of Duluth (hereinafter “Owner”) and Contractor (hereinafter “Construction Manager/General Manager,” “Contractor,” and “Contractors”).

It is understood by the parties to this Agreement that it is the policy of the Owner that the construction work covered by this Agreement shall be contracted to Contractors who agree to be bound by the terms of this Agreement. Therefore, the Union agrees that other Contractors may execute the Agreement for the purpose of covering that work. The Construction Manager/General Contractor shall monitor compliance with this Agreement by all Contractors who through their execution of this Agreement, together with their subcontractors, have become bound hereto.

The term “Contractor” shall include all Contractors and subcontractors of whatever tier engaged in on-site construction work within the scope of this Agreement.

The Union and all signatory Contractors agree to abide by the terms and conditions contained in this Agreement with respect to the administration of the Agreement by the Owner and the performance of the construction by the Contractor of the Project. This Agreement represents the complete understanding of the parties, and it is further understood that no Contractor party is required to sign any other agreement as a condition of performing work within the scope of this Agreement. No practice, understanding or agreement between a Contractor and a Union party which is not explicitly set forth in this Agreement shall be binding on any other party unless endorsed in writing by the Project Contractor.

ARTICLE I - PURPOSE

The (Project), an undertaking of the Owner, is a public project which will employ numbers of skilled and unskilled workers. Construction of the Project will entail utilization of the construction industry in an area having multiple labor contracts and employer associations. Consequently, conflicts within labor-management relations could cause delay or disruption of the efficient completion of the .project unless maximum cooperation of all segments of the construction industry is obtained. This Agreement is to establish as the minimum standards on the Project the hours and working conditions as those prevailing for the largest number of workers engaged in the same classes of work within the area.

It is in the public interest that the Project progress and be completed in an expeditious and efficient manner, free of disruption or delay of any kind. Therefore, it is essential to secure optimum productivity and to eliminate any delays in the work. 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 Project Labor Agreement, the parties agree to establish effective and binding methods for the settlement of all misunderstandings, disputes or grievances which may arise. Therefore, the Unions agree not to engage in any strike, slowdown or interruption of work and the Contractor agrees not to engage in any lockout.

ARTICLE II - SCOPE OF THE AGREEMENT

Section 1. This Agreement, hereinafter designated as the “Project Labor Agreement” or “Agreement,” shall apply and is limited to all construction work included in all Bid Categories for the (Project), under the direction of the signatory Contractors and performed by those Contractor(s) of whatever tier which have contracts awarded for such work on and after the effective date of this Agreement with regard to the Project.

Such Project is generally described as the construction of:
(Project)

Section 2. It is agreed that all direct subcontractors of a Contractor, of whatever tier, who have been awarded contracts for work covered by this Agreement on or after the effective date of this Agreement shall be required to accept and be bound by the terms and conditions of the Project Labor Agreement.

Section 3. 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 supervisory employees as defined by the National Labor Relations Act.

Section 4. All employees covered by this Agreement shall be classified in accordance with work performed and paid the base hourly wage rates for those classifications as specified in the attached Schedule A.

Section 5. The Contractors agree to pay contributions to the established employee benefit funds in the amounts designated in the appropriate Schedule A.

Contractors that are not signatory to a collective bargaining agreement beyond the scope of this Agreement (“PLA contractor”) may select to participate in the legally established industry health reimbursement arrangement (“HRA”) plan, in lieu of contributing to the respective bona fide benefit funds as designated in Schedule A. The amount of the contribution is based on the difference between the contribution amount of the bona fide Schedule A benefit funds and the cost of the PLA contractor's bona fide non-discretionary plans. Contributions must be made on behalf of named employees. Participating contractors will submit to the Trustees of the HRA trust and plan a copy of their plan, summary plan description, and the premium structure for workers covered under the PLA contractor's bona fide, non-discretionary plans. The value of the PLA contractor's benefit plans are subject to confirmation by the Trustees of the HRA trust and plan. This may include an independent audit according to a policy as established by the Trustees. Contractors are required to submit certified payroll reports to the Trustees or authorized administrator in order to confirm compliance with the terms of the HRA trust and plan.

The Contractors adopt and agree to be bound by the written terms of the legally-established Trust Agreements (or in lieu thereof, the aforementioned HRA plan and trust including any policies) 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 6. In the event of any conflict between any provisions of this Agreement and in the Local Area Agreements, the terms of this Agreement will be applied. In other words, where a subject covered by the provisions of this Project Labor Agreement is also covered by the Local Area Agreement the provisions of this Project Labor Agreement shall prevail. Where a subject is covered by the Local Area Agreement and not covered by this Project Labor Agreement, the Local Area Agreement provisions shall prevail.

Section 7. This Agreement shall only be binding on the signatory parties hereto and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such party.

Section 8. This Agreement shall be limited to work historically recognized as construction work. Nothing contained herein shall be construed to prohibit, restrict, or interfere with the performance of any other operation, work or function which may occur in or around the Project site or be associated with the development of the Project, or with the ongoing operations of the Owner.

Section 9. It is understood that the liability of any Contractor and the liability of the separate Unions under this Agreement shall be several and not joint. The Union agrees that this Agreement does not have the effect of creating any joint employment status between or among Owner and any Contractor.

Section 10. All workers delivering fill, sand, gravel, crushed rock, transit/concrete mix, asphalt or other similar materials and all workers removing any materials from the construction site as required by the specifications are subject to the provisions of the Minnesota state

prevailing wage law and are entitled to the appropriate area standard wage. For purposes of this contract, such materials are for specified future use and per Minnesota state prevailing wage law delivery and pickup of the above-listed materials constitutes incorporation.

ARTICLE III - UNION RECOGNITION AND REPRESENTATION

Section 1. The Contractor recognizes the Union as the sole and exclusive bargaining representative of all craft employees working on facilities 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 fully comply with the posted visitor and security and safety rules of the Project.

ARTICLE IV - LABOR HARMONY CLAUSE

The contractor shall furnish labor that can work in harmony with all other elements of labor employed on that (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, slow downs, 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 city of Duluth may have, including without limitation the right to terminate the contract.

ARTICLE V - WORK STOPPAGES AND LOCKOUTS

Section 1. There shall be no strike, picketing, work stoppages, slowdowns or other disruptive, activity for any reason by the Union or employees against any Contractor covered under this Agreement, and there shall be no lockout by the Contractor. Failure of any Union or employee to cross any picket line established by any union, signatory or non-signatory, or any other organization, at or in proximity to the Project site is a violation of this Article.

Section 2. Any party alleging a breach of Section 1, of Article IV shall have the right to petition a court for temporary and permanent injunctive relief. The moving party need not show the existence of irreparable harm, and shall be required to post bond only to secure payment of court costs and attorney fees as may be awarded by the court.

ARTICLE VI - DISPUTES AND GRIEVANCES

Section 1. This Agreement is intended to provide close cooperation between management and labor. The Construction Manager/General Contractor and the Building and Construction Trades Council shall each assign a representative to this Project for the purpose of assisting the Local Unions, together with the Contractor, to complete the construction of the Project economically, efficiently, continuously and without interruption, delays or work stoppages.

Each Contractor shall hold a pre-job conference with the Union and Construction Manager/General Contractor to clear up any project question and work assignments in which there is thought to be a difference in opinion. Every effort will be made to hold such conference well in advance of actual work performance.

Section 2. The Contractor, Union, and employees collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of the work of the Project, and agree to resolve disputes over grievances in accordance with the arbitration provisions set forth in the Local Area Agreements in effect with the Unions listed in Schedule A attached hereto.

ARTICLE VII - JURISDICTIONAL DISPUTES

Section 1. There will be no strikes, work stoppages, slowdowns, or other disruptive activity arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted as assigned by the Contractor.

Section 2. Building construction work shall be assigned by the Contractor in accordance with the procedural rules of the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (hereinafter the "Plan"). Any jurisdictional dispute over the Contractor's assignment of work shall be settled in accordance with the provisions of the Plan.

Section 3. Where a jurisdictional dispute involves the International Brotherhood of Teamsters, it shall be referred for resolution to that International Union and the disputing International Union. The resolution of the dispute shall be reduced to writing, signed by the authorized representative of the International Unions and the Contractor. The assignments made by the Contractor shall be followed until such time as the dispute is resolved in accordance with this Section.

ARTICLE VIII - 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 nonmembership in a Union or based upon race, color, religion, sex, 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 both genders.

ARTICLE IX - 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 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 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 X DURATION OF THE AGREEMENT

The Project Labor Agreement shall be effective the _____ day of _____, 2008, and 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.

IN WITNESS WHEREOF the parties have entered into this Agreement to be effective as of the day and year above written.

DULUTH BUILDING AND
CONSTRUCTION TRADES COUNCIL

CONTRACTOR

By: _____

By: _____

Its _____
(Printed Name/Title)

Its _____
(Printed Name/Title)

Date: _____

Date: _____

CITY OF DULUTH

By: _____
Mayor

Attest:

City Clerk

Date: _____

City Auditor

Date: _____

Assistant City Attorney

Date: _____

SCHEDULE "A"

- A1 Asbestos Workers Local 49
- A-2 Boilermakers Local 647
- A-3 BAC Local 1 Chapter 3 Duluth & Iron Range
- A-4 Carpenters Local 361
- A-5 Cements Masons/Plasterers 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 & Machinery Erectors 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

**CONTRACTOR
&
CITY OF DULUTH**

THIS AGREEMENT, effective as of the date of attestation by the City Clerk, is made by and between the **CITY OF DULUTH**, a municipal corporation, hereinafter referred to as the "CITY," party of the first part, and _____ (**Contractor Name**), _____ (**Contractor Address, City, State, Zip Code**), hereinafter referred to as the "Contractor," party of the second part;

WITNESSETH: That the Contractor and the City agree as follows:

1. The following shall be deemed to be part of this contract:
 - a. The annexed resolution and legal advertisement of the City Council.
 - b. The bid request and specifications, as modified by irreconcilable language in this written contract.
 - c. The bid by Contractor, as modified by irreconcilable language in this written contract.
 - d. The performance bond and payment bond certification.
 - e. The project labor agreement, if applicable.
 - f. All provisions of law applicable to a contract of this nature.

2. The Contractor agrees to furnish and deliver to the City Department of _____ all labor, supervision, material, equipment, supplies, insurance, performance bond, payment bond and everything else necessary for general construction of _____ (Project Description) at _____ (Location of Project), all in strict accordance with plans and specifications prepared by _____ (City Architect/Engineer or City's Designated Consultant), your bid of _____ \$ (Vendor Bid Amount) and Council Resolution No. _____, passed _____ (Month/Day & Year of Resolution Passage). Contractor shall not commence performance of any work under this contract until Contractor receives authorization from the City's Purchasing Agent in writing and dated.

3. The City agrees to pay progress payments and make final payments to the Contractor as stated in the contract specifications. The total amount payable under this contract shall not exceed _____ (Sum in words) _____ (Sum in dollars) unless the contract is modified by formal amendment or change order. Payments under this Agreement shall be made from the following accounts _____, Vendor Code _____, Requisition No. _____.

4. The Contractor shall furnish and maintain in full force and effect until this contract is completely performed by the Contractor, a performance bond and payment bond if and when required by law, or if and when required by the City.

5. Inasmuch as this contract concerns work, materials and equipment needed for the public benefit, the provisions of this contract relating to the time of performance and completion of work and delivery of materials or equipment are of the essence of this contract.
6. The Contractor will defend, indemnify and save the City harmless from all costs, charges, damages, and loss of any kind that may grow out of the matters covered by this contract. Said obligation does not include indemnification of the City for claims of liability arising out of the sole negligent or intentional acts or omissions of City but shall include but not be limited to the obligation to defend, indemnify and save harmless the City in all cases where claims of liability against the City arise out of acts or omissions of City which are derivative of the negligence or intentional acts or omissions of Contractor such as, and including but not limited to, the failure to supervise, the failure to warn, the failure to prevent such act or omission by Contractor and any other such source of liability. In addition Contractor will comply with all local, state and federal laws, rules and regulations applicable to this contract and to the work to be done and things to be supplied hereunder.
7. Insurance
 - a. Contractor shall provide the following minimum amounts of insurance from insurance companies authorized to do business in the state of Minnesota, which insurance shall indemnify Contractor and City from all liability described in Paragraph 6 above, subject to provisions below.
 - (1) Workers' compensation insurance in accordance with the laws of the State of Minnesota.
 - (2) Public Liability and Automobile Liability Insurance with limits not less than **\$1,500,000** Single Limit, and twice the limits provided when a claim arises out of the release or threatened release of a hazardous substance; shall be in a company approved by the city of Duluth; and shall provide for the following: Liability for Premises, Operations, Completed Operations, Independent Contractors, and Contractual Liability.
 - (3) City of Duluth shall be named as **Additional Insured** under the Public Liability, Excess/Umbrella Liability* and Automobile Liability, or as an alternate, Contractor may provide Owners-Contractors Protective policy, naming itself and the City of Duluth. Contractor shall also provide evidence of Statutory Minnesota Workers Compensation Insurance. Contractor to provide Certificate of Insurance evidencing such coverage with 30-days notice of cancellation, non-renewal or material change provisions included. The City of Duluth does not represent or guarantee that these types or limits of coverage are adequate to protect the Contractor's interests and liabilities.

**An umbrella policy with a "following form" provision is acceptable if written verification is provided that the underlying policy names the City of Duluth as an additional insured.*

- (4) If a certificate of insurance is provided, the form of the certificate shall contain an unconditional requirement that the insurer notify the City without fail not less than 30 days prior to any cancellation, non-renewal or modification of the policy or coverages evidenced by said certificate and shall further provide that failure to give such notice to City will render any such change or changes in said policy or coverages ineffective as against the City.
 - (5) The use of an “ACORD” form as a certificate of insurance shall be accompanied by two forms – 1) ISO Additional Insured Endorsement (CG-2010 pre-2004) and 2) Notice of Cancellation Endorsement (IL 7002) or equivalent, as approved by the Duluth City Attorney’s Office.
 - b. The insurance required herein shall be maintained in full force and effect during the life of this Agreement and shall protect Contractor, its employees, agents and representatives from claims and damages including but not limited to personal injury and death and any act or failure to act by Contractor, its employees, agents and representatives in the negligent performance of work covered by this Agreement.
 - c. Certificates showing that Contractor is carrying the above described insurance in the specified amounts shall be furnished to the City prior to the execution of this Contract and a certificate showing continued maintenance of such insurance shall be on file with the City during the term of this Contract.
 - d. Contractor shall be required to provide insurance meeting the requirements of this Paragraph 7 unless Contractor successfully demonstrates to the satisfaction of the City Attorney, in the exercise of his or her discretion, that such insurance is not reasonably available in the market. If Contractor demonstrates to the satisfaction of the City Attorney that such insurance is not reasonably available, the City Attorney may approve an alternative form of insurance which is reasonably available in the market which he or she deems to provide the highest level of insurance protection to the City which is reasonably available.
8. No claim whatsoever shall be made by the Contractor against any officer, agent or employee of the City for, or on account of, anything done, or omitted to be done, in connection with this contract. If this contract is not made in conformity with mandatory provisions of any statute or of the ordinances and charter of the City of Duluth, the Contractor agrees to raise no defense and make no claim against the City on the basis of ratification, laches, estoppel, or implied contract.
 9. The Contractor shall not assign, transfer, convey or otherwise dispose of this contract, or his right to execute it, or his right, title or interest in or to it, or any part thereof, without the consent of the City, evidenced by a resolution duly adopted by the City Council. The prohibition contained in this paragraph shall not be deemed to prevent the contractor from subcontracting. Contractor shall remain primarily responsible for all work performed by any subcontractor.
 10. The Contractor agrees that in the hiring of common or skilled labor for the performance of any work under this contract, Contractor will not discriminate by reason of race, creed or

color, religion, national origin, sex, marital status, status with regard to public assistance, disability or age.

11. The Contractor agrees that Contractor shall not in any manner discriminate against or intimidate or prevent the employment of any person or persons, or on being hired, prevent or conspire to prevent any person or persons from the performance or work under this contract on account of race, creed or color, religion, national origin, sex, marital status, status with regard to public assistance, disability or age.
12. The contractor agrees that, as provided in Minnesota Statutes 16C.05, Subd. 5, contractor's books, records, documents, and accounting procedures and practices are subject to examination by the City or the state auditor for six years from the date of final payment under this contract.
13. This contract may be cancelled or terminated by the City and all moneys due or to become due hereunder may be forfeited for any failure to perform any terms or conditions of this contract including but not limited to any violation of the terms or conditions of Section 10 or 11 of this contract.
14. Any waiver by any party of any provision of this contract shall not imply a subsequent waiver of that or any other provision.
15. This contract is made in the state of Minnesota and shall be construed and interpreted in accordance with the laws of the State of Minnesota. The appropriate venue and jurisdiction for any litigation hereunder shall be in a court located in St. Louis, County, Minnesota, and the parties to this Agreement waive objection to the jurisdiction of this court, whether based on convenience or otherwise.
16. This Agreement constitutes the entire agreement between the City and the Contractor on the subject matter hereof. It may not be changed, modified, discharged or extended except by written instrument duly executed on behalf of the City and the Contractor. The Contractor agrees that no representations or warranties made by the City shall be binding upon the City unless expressed in writing herein.
17. This Agreement shall not be in force and effect, or in any way binding upon the City until the same shall have been approved by the Director of _____ (Department Name), signed by the Mayor, attested by the Clerk, and countersigned by the City Auditor.
18. The Contractor unconditionally guarantees to perform all work pursuant to this contract in a good and workmanlike manner, in strict compliance with the specifications and instructions hereto attached, and to the satisfaction of the City of Duluth.
19. This Agreement may be executed in counterparts, each of which shall be deemed to be original and all of which together shall constitute the binding and enforceable agreement of the parties hereto. This Agreement may be executed and delivered by a party by facsimile or PDF transmission, which transmission copy shall be considered an original and shall be binding and enforceable against such party.

CITY OF DULUTH

CONTRACTOR

Mayor

Attest:

City Clerk

Date: _____

Countersigned:

City Auditor

Approved as to form:

City Attorney

Department Director

Purchasing Agent

By _____
Its _____

And By _____
Its _____

SECTION 01 11 00 - SUMMARY OF THE WORK**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

1.02 DEFINITIONS

- A. The word "Owner" as the same may be used herein refers to the City of Duluth.
- B. The word "Contractor" refers to a party or parties entering into a contract with the City of Duluth.
- C. The word "Work" refers to the specified undertaking, including the labor, materials, apparatus, equipment, etc., required in that connection.
- D. The words "Architect/Engineer" refers to Architectural Resources, Inc., 704 East Howard Street, Hibbing, MN 55746; phone 218/263-6868, fax 218/722-6803.

1.03 GENERAL

- A. All Articles in these General Requirements (Division 01) are applicable to all Divisions and Sections of the work included herein. The Conditions of the Contract, General and Supplementary General Conditions, and these General Requirements shall apply with equal force and effect to the Contractor and subcontractors engaged in this work.
- B. Sequence of operations or place of commencement may be determined by the Architect/Engineer as deemed to best serve the needs and convenience of the Owner, or as necessity of occasion requires.
- C. The Architect and his representatives, and designated representatives of the Owner shall have access to the construction site at all times. Contractor shall give Architect sufficient advance notice of when work specifically requiring Architects approval will be done to avoid delaying the work.

1.04 SPECIAL SITE CONDITIONS

- A. Confine all operations, equipment, apparatus and storage of materials to the immediate area of work to the greatest possible extent. Contractor shall ascertain, observe and comply with all rules and regulations in effect on the project site, including, but not limited to parking and traffic regulations, use of walks, security restrictions and hours of allowable ingress and egress.
- B. Information pertaining to existing conditions that appear on the drawings, are based on available records. While such data has been collected with reasonable care, there is no expressed or implied guarantee that conditions so indicated are entirely representative of those actually existing or that unlooked for developments may not occur. They are merely provided to assist the Contractor in the investigation of conditions.

1.05 INSPECTION OF SURFACES

- A. Contractor shall obtain complete data at the site and inspect surfaces that are to receive the work before proceeding with fabricating, assembling, fitting or erecting his work.
- B. The Contractor shall notify the Architect/Engineer in writing in case of discrepancies between existing work and drawings, and defects in such surfaces that are to receive the contractor's work. The Architect/Engineer will direct such work or surfaces to be remedied.
- C. Starting of work implies acceptance of the work of others. Removal and replacement of work applied to

defective surfaces, in order to correct defects, shall be done at the expense of the contractor who applied work to defective surfaces.

1.06 CUTTING AND PATCHING

- A. The Contractor shall do all cutting or fitting of the work as required to make its several parts fit together, or to receive the work of others, as shown or reasonably implied by the drawings or specifications, or as may be directed by the Architect/Engineer. Holes cut in exterior walls shall be waterproofed.
- B. The Contractor who cuts shall also be responsible for patching. Where cutting and patching is required, the Contractor shall hire individuals skilled in such work to do cutting and patching.
- C. Contractor shall not endanger any work by cutting, digging or otherwise and shall not cut or alter the work of others without their consent.
- D. Wherever any material, finish, or equipment is damaged, the repair or replacement shall be accomplished by the trade skilled in that particular work and the cost shall be charged to the party responsible for the damage.

1.07 MANUFACTURER'S DIRECTIONS

- A. Contractor shall apply, install, connect, erect, use, clean and condition manufactured articles, materials, and equipment as recommended by the manufacturer.
- B. Where specific installation instructions are given in this specification it shall be understood that these instructions are based on the installation system of one of the specified manufacturers and the minimum standards required by the Architect.
- C. Bidders shall verify the material and installation requirements of the specific specified manufacturer they intend to use to verify if the specific manufacturer's requirements are more or less stringent than those considered the minimum by the Architect. Standards which are below the minimum of those established by the Architect shall be brought into conformance with the minimum standards of the Architect. Standards of a specific manufacturer that are above those established by the Architect as the minimum shall be installed to the requirements of the specific manufacturer.

1.08 PROTECTION IN GENERAL

- A. Structures and equipment shall be constructed, installed and operated with guards, controls, and other devices in conformance with applicable safety regulations.
- B. The Contractor/General Trade shall:
 - 1. Provide, erect and maintain all required planking, barricades, guard rails, temporary walkways, etc., of sufficient size and strength necessary for protection of stored material and equipment; paved surfaces, walks, curbs, gutters, and drives; streets adjacent to or within project area; adjoining property and the new building as well as to prevent accidents to the public and the workmen at the job site.
 - 2. Notify owners of corporate or private property if their property interferes with the work so that arrangements for proper protection can be made.
 - 3. Provide temporary protection around openings through floors and roofs, including elevator openings, stair wells, and edge of slabs.
 - 4. Provide and maintain proper shoring and bracing for existing underground utilities, sewers, etc., encountered during excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the new work, or can be properly backfilled

upon completion of new work.

5. Provide protection against rain, snow, wind, ice, storms or heat so as to maintain all work, materials, apparatus, and fixtures, incorporated in the work or stored on the site, free from injury or damage. At the end of the day's work, cover all new work likely to be damaged. Remove snow and ice as necessary for safety and proper execution of the work.
6. Protect building and foundations from damage at all times from rain, ground water and backup from drains or sewers. Provide all equipment and enclosures as necessary to provide this protection.
7. Damaged property shall be repaired or replaced in order to return it to its original condition. Damaged lawns shall be replaced with sod.
8. Protect materials, work and equipment, as specified in 5 above until construction proceeds to a point where they can be moved into the building and the building will provide this protection. Protect work outside of the building lines such as trenches and open excavations, as specified above.
9. Take any and all necessary precautions to protect Owner's property as well as adjacent property, including trees, shrubs, buildings, sanitary and storm sewers, water piping, gas piping, electric conduit or cable, etc., from any and all damage which may result due to work on this project.
10. Repair work outside of property line in accordance with the requirements of the authority having jurisdiction.
11. Repair any work, damaged by failure to provide proper and adequate protection, to its original state, to the satisfaction of the Owner or remove and replace with new work at the contractor's expense.

1.09 CLEANING

- A. The Contractor shall be responsible for all cleaning required within the technical sections of the specifications governing work under the Contractor's jurisdiction as well as for keeping all work areas, passageways, ramps, stairs and all other areas of the premises free of rubbish, debris and scrap which may be caused by the Contractor's operations or that of the subcontractors.
 1. Remove rubbish, debris and scrap promptly upon its accumulation and in no event later than the end of each week.
 2. Combustible waste shall be removed immediately or stored in fire resistive containers until disposed of in an approved manner.
 3. No burning of rubbish or debris will be allowed at the site. Rubbish, debris and scrap shall not be thrown through any window or other opening, or dropped from any great height; it shall be conducted to the ground, to waiting truck(s) or removable container(s) by means of approved chutes or other means of controlled conveyance.
 4. Form or scrap lumber shall have all nails withdrawn or bent over; shall be neatly stacked, placed in trash bins, or removed from the premises.
 5. Spillages of oil, grease or other liquids which could cause a slippery or otherwise hazardous situation or stain a finished surface, shall be cleaned up immediately.
 6. Dust, dirt or other foreign matter shall be removed completely from all internal surfaces of all mechanical and electrical units, cabinets, ducts, pipes, etc.

7. Dirt, soil, fingerprints, stains and the like shall be completely removed from all exposed finished surfaces.
- B. Contractor/General Trade shall wash all glass immediately prior to the occupancy of this project. Work shall include the removal of labels, paint splattering, glazing compound and sealant. Surfaces shall include mirrors and both sides of all glass in windows, borrowed lights, partitions, doors and side lights.
- C. Broken scratched or otherwise damaged glass shall be removed and replaced with new.
- D. In addition to the above, the Contractor/General Trade shall be responsible for the general "broom" cleaning of the premises and for expediting all of the cleaning, washing, waxing and polishing required within the technical sections of the specifications governing work under his contract. The Contractor/General Trade shall also perform "Final" cleaning of all exposed surfaces to remove all foreign matter, spots, soil, construction dust, etc., so as to put the project in a complete and finished condition ready for acceptance and use intended.
- E. If rubbish and debris is not removed, or surfaces cleaned as specified above, the Owner reserves the right to have said work done by others and the related cost(s) will be deducted from monies due the Contractor.

1.10 PARKING

- A. Construction personnel shall confine parking of private vehicles to within the area of the project limits or to those parking spaces available on public streets.

1.11 STORMWATER MANAGEMENT & EROSION CONTROL

- A. In accordance with good soil conservation practices, the Contractor/General Trade shall be governed by the following:
 1. The Contractor hereby covenants to maintain all project grounds, public streets and associated areas, including fill areas in a manner consistent with the general policy to conserve soil and soil resources and to control and prevent soil erosion and to control and prevent siltation into lakes, rivers and streams. This clause is to be liberally construed to further the above stated objectives. The following shall include, but not limit areas in which control is to be exercised.
 - a. Minimum Stripping: Strive to limit stripping of sod and vegetation to a period that will expose bare soil to least possibility of erosion that construction requirements will allow.
 - b. Stockpiling: Material shall be stored in a manner that will not result in runoff of stockpiled material into streets or drainage facilities in the event of rain.
 - c. Stormwater Runoff and Erodible Materials: Take positive measures to prevent soil erosion from the construction area and areas disturbed by construction activities by employing such means as: mulches, intercepting embankments, settling basins, ditch checks, riprap, erosion mats, or other temporary erosion control devices or methods.

1.12 SUBSTITUTION OF MATERIALS

- A. Whenever a material, article or piece of equipment is identified on the drawings or in the specification by reference to manufacturers or vendors name, trade name, catalog number, etc., it is intended to establish a standard; and any material, article, or equipment of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally accepted provided the material, article or equipment so proposed is, in the opinion of the Architect/Engineer, or equal in substance and function. It shall not be purchased or installed by the Contractor without the Architect/Engineer's written approval prior to bid opening.

- B. Materials or equipment items of other manufacture may be submitted for approval only upon the following conditions:
1. That, in the opinion of the Architect/Engineer, the proposed material or equipment item is fully equal (in design, materials, construction, workmanship, performance, finish, etc.) to the named item. No compromise in quality level, however small, is acceptable.
 2. That in substituting materials or equipment, Contractor assumes responsibility for any changes in system or for modifications required in adjacent or related work to accommodate such substitution, despite the Architect/Engineer approval and all costs growing out of the approval of "or equal" items shall be the responsibility of the Contractor. None of the extra costs resulting from such approval shall devolve upon the Owner, the Architect/Engineer or any other separate Contractor.
- C. It shall be understood that the use of materials or equipment other than those specified, or approved equal by the Architect/Engineer, shall constitute a violation of contract and that the Architect/Engineer shall have the right to require the removal of such materials or equipment and their replacement with the specified materials or equipment at the Contractor's expense.
- D. Manufacturers and suppliers seeking approval of their products during the bidding phase shall submit requests to the Architect/Engineer in the following manner:
1. Submit two (2) copies of all requested material to the Architect five (5) working days prior to bid closing. Any material requests for approval received by the Architect less than five (5) working days prior to bid closing will not be considered and are thereby not approved. Submittal shall include a self-addressed, stamped envelope of sufficient size to hold one (1) copy of all submitted material and enough postage to insure its return.
 2. Submit a "Request for Approval" letter which shall state the name and location of the project; the name, address, phone number, fax number of the supplier or manufacturer and the name of the person representing the product. Letter shall further state the name and model number of the product being requested "or equal".
 3. Submit product literature on the proposed "or equal" product. Literature shall contain sufficient data, tests, and manufacturing information to allow the Architect to judge if the product will be considered equal.
 4. Approval of a product as "or equal" prior to bid closing will not relieve the successful bidder of complying with Paragraph B above.
 5. All products approved to bid will be listed in an addendum.
 6. Fax and electronic submittals will be accepted until **noon** local time five (5) working days prior to bid closing. Any material received less than five (5) working days prior to bid closing will not be considered, will not be recorded by addendum and thereby is not approved.
- E. No request for approval of "or equal" materials will be entertained except from the prime contractor after contracts have been awarded. Such request will only be considered under the following conditions:
1. Failure of the supplier/subcontractor of the specified material to comply with the specifications and job requirements.
 2. An excessively long delivery date of the specified material which will cause a delay in the job.
 3. Cost of the specified material is substantially more than an equal product, and this cost savings will be passed on to the Owner in the form of a credit.

END OF SECTION

SECTION 01 31 00 - COORDINATION**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

1.02 MUTUAL RESPONSIBILITY

- A. Contractor shall coordinate the work with adjacent work and shall cooperate with all other trades so as to facilitate the general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work and for the storage of their material. In no case will any contractor be permitted to exclude from the premises or work, any other Contractor or employees thereof, or interfere with any Contractor in the executing or installation of the work.
- B. Each trade shall perform its work in proper sequence in relation to that of other trades and as approved by the Architect/Engineer. Any cost caused by defective or ill-timed work shall be borne by the trade responsible therefore.
- C. Contractor shall arrange the work and dispose of materials so as not to interfere with the work or storage of materials of others and each shall join their work to that of others in accordance with the intent of the drawings and specifications.
- D. All trades shall work in cooperation with the Contractor and with each other, and fit their work into the structure as job conditions may demand. All final decisions as to right-of-way and run of pipes and ducts, etc. shall be made by the Architect/Engineer or an authorized representative at prearranged meetings with responsible representatives of the Trades involved. The General Contractor is responsible for hosting a coordination meeting with all trades to establish an acceptable layout of all materials and equipment.

1.03 SUPERVISION

- A. The Contractor/General Trade shall take complete charge of the work under this Contract and coordinate the work of all trades on the project.

1.04 CONSTRUCTION SCHEDULE & SUBMITTAL SCHEDULES

- A. Contractor shall prepare a schedule showing the anticipated start and completion of each major division of work based on the sections of this specification. This schedule shall be submitted to the Architect at or before the Preconstruction Meeting.
- B. Contractor shall update the schedule as more accurate information becomes available as to deliveries, subcontractor schedules, and delays in the work. Schedule shall be updated monthly and presented at progress meetings.
- C. Items requiring submittal to and review by the Architect (shop drawings, color samples, etc.) shall be submitted sufficiently in advance of their scheduled start to allow time for review. Architect will require ten (10) working days review time from the date submittals are received at the Architect's office.

END OF SECTION

SECTION 01 31 19 - PROJECT MEETINGS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

1.02 GENERAL

- A. Architect will schedule and administer a mandatory pre-bid meeting, a preconstruction meeting, periodic progress and coordination meetings, and specially called meetings throughout the progress of the work. The Architect will:
1. Notify trade contractors and Owner's representative of time and location.
 2. Record and distribute the minutes of the meetings.
- B. Representatives of Trade Contractors, subcontractors and suppliers attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. Architect may attend meetings to determine if the work is being expedited consistently with Contract Documents.

1.03 PRECONSTRUCTION MEETING

- A. A preconstruction meeting may be scheduled after date of Notice to Proceed is issued.
- B. The following items will be distributed and discussed at this meeting:
1. Organization arrangement of Owner's and Architect's forces and personnel, and those of contractors, subcontractors and material suppliers.
 2. Channels and procedures for communications.
 3. Construction schedule, including sequence of critical work.
 4. Contract Documents, including distribution of required copies of original Documents and revisions.
 5. Processing of Shop Drawings and other data submitted to the Architect for review.
 6. Processing of field decisions and Change Orders.
 7. Rules and regulations governing performance of the work.
 8. Procedures for quality control, housekeeping, and other related matters.

1.04 PROJECT MEETINGS

- A. Project meetings will be held at the time designated by the Owner. Contractor, when requested, shall attend project meetings. A responsible representative of the Contractor who can bind the contractor to a decision at the meetings shall attend.
- B. The Architect/Engineer, or a representative thereof, may write a report covering items discussed and distribute copies of the report to all parties identified at preconstruction meeting.

C. Proposed Agenda:

1. Review, revise as necessary, and approve minutes of the previous meeting.
2. Review progress of the Work since last meeting, including status of submittals for approval.
3. Identify problems which impede planned progress.
4. Develop corrective measures and procedures to regain planned schedule.
5. Complete other current business.
6. Verify contractor's schedule.

END OF SECTION

SECTION 01 32 23 - FIELD ENGINEERING**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

1.02 SITE CONDITIONS

- A. Contractor shall become acquainted with the location of underground services, utilities, structures, etc., which may be encountered or be affected by the Contractor's work, and shall be responsible for any damage caused by neglect to provide proper precautions or protection.
- B. Existing pipes, electrical work and all other utilities encountered, which may interfere with new work, shall be rerouted, capped, cut off or replaced by the trades having jurisdiction.

1.03 LAYOUT

- A. The Contractor shall immediately upon entering the site for purpose of beginning work, locate general reference points and take such action as is necessary to prevent their destruction. The Contractor shall lay out the work and be responsible for all lines, elevations and measurements of the building and other work executed by the Contractor under the contract. The Contractor must exercise proper precaution to verify figures on the drawings before laying out work and will be held responsible for any error resulting from failure to exercise such precaution.
- B. As work progresses, the Contractor shall lay out on forms and floor, the locations of all partitions, walls and fix column center lines as a guide to all trades.
- C. The Contractor shall make provision to preserve property line stakes, bench marks or datum point. If any are lost, displaced or disturbed through neglect of the contractor, contractor's agents or employees, the Contractor shall pay the cost of restoration.
- D. Contractor shall verify grades, lines, levels, locations, and dimensions as shown on drawings and report any errors or inconsistencies to the Architect/Engineer before commencing work. Starting of work by the Contractor shall imply acceptance of existing conditions.

END OF SECTION

SECTION 01 33 00 - SUBMITTALS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. Provide submittals as noted in each Section of this Specification.
- C. Allow for at least two weeks review of submittals to avoid delay of the Work.
- D. Include with submittal preparation, field verifications of measurements, field construction criteria, verification of catalog numbers and similar data, and coordination of Work requirements and Contract Documents.
- E. Requirements of this section are intended to supplement the City of Duluth requirements and not supersede them. If conflicts arise, contact the Architect for clarification.

1.02 SCHEDULE OF VALUES

- A. At the time the Contractor submits his signed Contract and list of subcontractors, he shall submit a schedule of values prepared in such a manner that each major item of work and each subcontracted item of work is shown as a single line item.
- B. The value of the work shall generally be itemized by specification section. When an item of work may be furnished by one Subcontractor or material supplier and installed by the Trade Contractor or another subcontractor, separate items shall be included for the value of the material or equipment furnished to the site and the value of its site handling costs and installation.
- C. Items of a general or temporary nature, such as bond premiums or temporary heat, shall be itemized in sufficient detail so that payment may be made as the item of work is completed.
- D. Each item in the Schedule of Values shall contain its proper share of overhead and profit.
- E. Prepare schedule of values on AIA Document G703, Certificate For Payment, Continuation Sheet.
- F. Scheduling of values will be used as a basis for reviewing the Contractor's Applications for Payment.

1.03 CONSTRUCTION SCHEDULE

- A. At the preconstruction meeting contractor shall present a Contractors Construction Schedule for the Work. The Schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.
- B. The Contractor shall prepare and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

1.04 SHOP DRAWINGS, SAMPLE SUBMITTALS

- A. Shop drawings shall consist of drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.

- B. Samples shall consist of physical examples furnished by the Contractor in sufficient size and quantity to illustrate materials, equipment or workmanship, and to establish standards by which work will be judged.
- C. Prior to submitting samples and shop drawings to the Architect, Contractor shall review and stamp them with his shop drawing review stamp. Shop drawings shall be signed by the person who reviewed them. By stamping and signing shop drawings and samples the Contractor affirms that he has reviewed and coordinated each shop drawing and sample with the requirements of the contract documents. He further represents that he has, or will, verify all field measurements, field construction criteria and similar data. Shop drawings and samples not so noted and stamped will be returned to the Contractor without being examined by the Architect/Engineer.
- D. Submit five (5) copies or one (1) PDF electronic copy of all shop drawings for General Construction Divisions for distribution as follows by the Architect:
 - 1. 1 set for the Architect.
 - 2. 1 set of Mechanical/Electrical for the Engineer.
 - 3. 1 set for the Owner.
 - 4. 3 sets for the Contractor distributed as follows:
 - a. 1 set for job site.
 - b. 1 set for contractor's office.
 - c. 1 set for the supplier.
- E. Submit two (2) of each sample requested. Samples shall be of adequate size to show quality, type, color range, finish and texture. Label each sample stating material, type, color, thickness, size, project name and contractor's name. Submit transmittal letter requesting approval along with samples. One (1) set of approved samples shall become the property of the Architect. The other shall be kept at the job site until substantial completion and then turned over to the Owner.

1.05 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Contractor shall provide the Architect with three sets of the following, covering each and every item of equipment and devices furnished or erected by the Contractor prior to "Substantial Completion":
 - 1. Catalog data or literature.
 - 2. Manufacturer's operating instructions.
 - 3. Manufacturer's maintenance instructions.
 - 4. Installation instructions.
 - 5. Parts list (including name and address of nearest vendor).
- B. These materials shall be submitted in 3-ring loose leaf binders on 8-1/2" x 11" paper with the entire contents indexed and thumb-tabbed.
- C. The correct model number shall be checked off in ink where the literature covers more than one model number.
- D. For items assembled by the Contractor for special functions, the Contractor shall write up and provide duplicate operating and maintenance instructions.
- E. The manual shall contain narrative of the control cycle for the control equipment.
- F. Provide field instruction to Owner's personnel as required to fully instruct them in correct operation and maintenance procedures for all mechanical and electrical equipment.

1.06 WARRANTIES AND BONDS

- A. Assemble and submit to the Owners representative warranties, bonds and service and maintenance contracts as specified in the respective sections of the specifications. The table of contents for this submittal shall include the product or work item; the firm, with the name of the principal, address and telephone number; scope; date of beginning of warranty, bond or service and maintenance contract; duration; information for the Owner's personnel providing the proper procedure in case of failure and instances which might affect the validity of the warranty or bond.
- B. The beginning date of the warranty will be the date of substantial completion or a later date when the work is finally accepted.
- C. Prime Contractors shall guarantee and make good without cost to the Owner any defects, settlements, shrinkages or other faults in work arising from improper materials or workmanship on his part which may appear within one (1) year after the acceptance of the work (except for specified guarantees for another length of time specified elsewhere). The Contractor shall, immediately upon notification by the Architect, proceed at his own expense to replace and repair such work together with any damages to finish, fixtures, equipment, furnishings that may result due to defective work or faults. Any payments for this work shall not relieve him in any way from his responsibility. In case the Contractor fails to do work so ordered, the Owner may have work done, charge the cost thereof against monies retained as provided for in the agreement. If said retained monies are insufficient to pay such cost or if no money is available, the Contractor and his sureties agree to pay the Owner the cost of such work. Nothing herein intends or implies that guarantee shall apply to work which has been abused or neglected by the Owner.

1.07 TEST REPORTS

- A. Reports of inspections, tests and approvals required by the Contract Documents shall be submitted directly to the Architect in duplicate.

END OF SECTION

SECTION 01 70 00 - PROJECT CLOSEOUT**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.

1.02 SUBSTANTIAL COMPLETION

- A. When the Contractor considers the Work Substantially Complete, submit to the Owner and Architect the following:
1. A written notice that the Work, or designated portion thereof, is substantially complete.
 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, Architect and Owner will make an inspection to determine the status of completion.
- C. Should the Architect determine that the Work is not Substantially Complete:
1. Architect will promptly notify the Contractor, in writing, giving the reasons thereafter.
 2. Remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the Architect.
 3. Architect will reinspect the Work.
- D. When the Architect finds that the Work is Substantially Complete, he will:
1. Prepare and deliver to the Owner a tentative Certificate of Substantial Completion on AIA Form G704, with a tentative list of items to be completed or corrected before final payment.
 2. After consideration of any objections made by the Contractor or the Owner as provided in the Conditions of the Contract, and when the Architect considers the Work Substantially Complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised list of items to be completed or corrected.

1.03 FINAL INSPECTION

- A. When the Work is considered complete, submit written certification to the Architect that:
1. Contract documents have been reviewed.
 2. Work has been inspected for compliance with Contract Documents.
 3. Work has been completed in accordance with Contract Documents.
 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 5. Work is clean and ready for final inspection.
- B. Architect will make an inspection to verify the status of completion with reasonable promptness after the receipt of such certification.

- C. Should Architect consider that the Work is incomplete or defective:
 - 1. Architect will promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2. Take immediate steps to correct the stated deficiencies, and send a second written certification to Architect that the Work is complete.
 - 3. Architect will reinspect the Work.

1.04 CLOSEOUT SUBMITTALS

- A. When the Owner has determined that the Work is acceptable under the Contract Documents and the Contract fully performed, prepare and submit final Application for Payment to the Architect, together with the following:
 - 1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706.
 - 2. Contractor's Affidavit of Release of Liens, AIA Document G706A.
 - 3. Contractor's lien waiver in the full amount of the Contract Sum.
 - 4. Lien waivers from all subcontractors, sub-subcontractors and major material suppliers who have furnished material for the Work under contract with the Contractor or subcontractor. The lien waivers shall be in the full amount of the Contract involved.
 - 5. Consent of surety to final payment on Consent of Surety Company to Final Payment, AIA Document G707.
 - 6. Affidavit for obtaining final settlement of Contract with the State of Minnesota and any of its Political or Governmental Subdivisions, Department of Revenue Form IC-134.
 - 7. Evidence of compliance with the requirements of governing authorities:
 - a. Certificate of Inspection from all required agencies and departments.
 - 8. Project record documents.
 - 9. Operating and Maintenance Data, Instructions to Owner's Personnel.
 - 10. Warranties and Bonds.
 - 11. Special tools required for Owner maintenance.
- B. Submit four copies each of items #1 thru #5 above, and two copies each of items #6, #7 and #9 above.
- C. All Contractors shall retain all loose and small detachable parts of apparatus and equipment furnished under this contract, until completion of the work, and shall turn them over to the Owner or Owner's representative designated to receive them. Contractor shall obtain from the Owner an itemized receipt thereof in triplicate. Contractor shall retain one copy of receipt for their files and shall attach the other two to request for final payment for the work.

1.05 RECORD DRAWINGS

- A. The Architect/Engineer will provide the Contractor with a suitable set of contract drawings on which daily records of changes and deviations from contract will be recorded. All buried or concealed piping,

conduit, or similar items shall be located by dimensions and elevations on the record drawings. Maintain at the site a complete set of drawings, specifications, shop drawings, and product data in clean undamaged condition and mark thereon actual installation which varies significantly from the work as originally shown. Mark whichever document is capable of showing the actual condition most fully and accurately; if shop drawings are used for such marking, cross reference the drawings and specifications to reflect this marking. Pay particular attention to exact location of concealed utilities, pipes, ducts, control valves, dampers and other features which would be difficult or impractical to locate at a future time. Include modifications made by change order or by direction of the construction administrator. Keep record documents current.

- B. The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.
- C. During the first week of each month, the Contractor shall present, at the project site, the job copy showing variations and changes to date to the Architect/Engineer and Project Representative for their review.
- D. At completion of the project, the Contractor shall submit the marked up record drawings to the Architect/Engineer prior to final payment. Clearly mark documents with erasable colored pencil. Organize documents into manageable sets, mark "Record Copy", affix contractor's name and date, indicate Owners project name, and deliver to the Architect. Final payment will not be made until these documents have been received by the Owner.

1.06 GUARANTEE DOCUMENTS

- A. Upon "Substantial Completion" of the project, Contractor shall submit such written guarantees to the Architect/Engineer for presentation to the Owner. Furnish guarantees in triplicate unless otherwise indicated.
- B. Prime Contractors shall guarantee and make good without cost to the Owner any defects, settlements, shrinkages or other faults in work arising from improper materials or workmanship on his part which may appear within one (1) year after the acceptance of the work (except for specified guarantees for another length of time specified elsewhere). The Contractor shall, immediately upon notification by the Architect, proceed at his own expense to replace and repair such work together with any damages to finish, fixtures, equipment, furnishings that may result due to defective work or faults. Any payments for this work shall not relieve him in any way from his responsibility. In case the Contractor fails to do work so ordered, the Owner may have work done, charge the cost thereof against monies retained as provided for in the agreement. If said retained monies are insufficient to pay such cost or if no money is available, the Contractor and his sureties agree to pay the Owner the cost of such work. Nothing herein intends or implies that guarantee shall apply to work which has been abused or neglected by the Owner.
- C. Unless otherwise stated in the specifications, warranties required by the contract documents shall commence on the date of substantial completion.

1.07 FINAL APPLICATION FOR PAYMENT

- A. Submit the final Application for Payment in accordance with the procedures and requirements stated in the Conditions of the Contract.

1.08 PUNCH LIST

- A. It is required that the punch list items be completed and initialed by the Contractor or Subcontractor that has performed the work and that the punch list must be returned to Architectural Resources, Inc., for the Owner's and Architect's review before final payment can be made.

END OF SECTION

SECTION 05 40 00 - LIGHT GAUGE METAL FRAMING**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all Light Gauge Metal Framing as shown on the drawings and specified herein.
- C. Related Work Specified Elsewhere:
 - 1. Structural Metal - Section 05 10 00
 - 2. Building Insulation - Section 07 21 00
 - 3. Gypsum Drywall - Section 09 20 00

1.02 REFERENCE STANDARDS

- A. ASTM A446.....Galvanized Steel Studs

1.03 SUBMITTALS

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the requirements of Division 01. For stock items requiring no special fabrication, manufacturer's literature, appropriately marked, will be acceptable in lieu of shop drawings. No material shall be ordered until such drawings have been approved.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle steel framing members in a manner that will prevent damage, warping and twisting during shipment or storage at the site.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. All light gauge steel framing members shall be of the type, size and gage shown on the drawings and shall be as manufactured by one of the following or approved equal:
 - 1. Dale/Incor Industries
 - 2. Dietrich Industries, Inc.
 - 3. Gold Bond Building Products
 - 4. Marino Industries Corp.
 - 5. Superior Steel Studs, Inc.
 - 6. Unimast, Inc.

2.02 MATERIALS

- A. All studs shall be galvanized steel studs formed from steel that corresponds to ASTM A446. Structural calculations shall be based on Grade D minimum yield strength 50. Galvanizing shall be a G-60 galvanized coating, meeting ASTM A525 and ASTM C955.
- B. Steel studs shall be sized as shown on the drawings.

2.03 FABRICATION

- A. Framing components may be pre-assembled into panels prior to erecting. Prefabricated panels shall be square with components attached in a manner as to prevent racking.
- B. All framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.

PART 3 - EXECUTION

3.01 ERECTION

- A. Framing components may be pre-assembled into panels prior to erecting. Prefabricated panels shall be square, with components attached in a manner to prevent racking and to minimize distortion while lifting and transporting.
- B. All framing components shall be cut squarely for attachment to perpendicular members, or as required for an angular fit against abutting members. Members shall be held positively in place until properly fastened.
- C. All framing components shall be plumbed, aligned and leveled.
- D. Provide insulation as specified in Section 07 21 00 in all double member areas that are inaccessible to the insulation contractor.
- E. Fastening of components shall be with self-drilling screws or welding. Screws and welds shall be of sufficient size to ensure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched up with a zinc rich paint.
- F. Splicing in framing components, other than runner track, shall not be permitted.
- G. Abutting lengths of runner shall be butt-welded, spliced or each length securely anchored to a common structural element. Runners shall be securely anchored to the supporting structure as shown on the erection drawings.
- H. Temporary bracing, where required shall be provided until erection is complete.
- I. Cutting of steel framing members may be accomplished with a saw or shear. Torch cutting of load bearing members is not permitted. Cutting of loaded members is not permitted unless under supervision of the project engineer.
- J. Diaphragm rated sheathing materials may be substituted for bridging if it is installed prior to the loading of the wall. If such material is installed on one side of the wall only, then the other stud flanges shall be bridged with suitable bridging. This bridging may be removed if and when such diaphragm rated sheathing is installed.
- K. Holes that are cut into steel framing members shall be within the limitations of the product and its design. Provide reinforcement where holes are cut through load bearing members in accordance with the manufacturer's recommendations and as approved by the Engineer.

3.02 INSTALLATION - NON-LOAD BEARING PARTITIONS

- A. Transversely loaded studs need not sit squarely in tracks but must be attached to them with the exception of special slip conditions. Displacement type connections shall be designed for 1" of movement and shall be fabricated using a double deep leg track at the top of the partition.

END OF SECTION

SECTION 07 21 00 - BUILDING INSULATION**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install insulation where shown or indicated on the drawings and as specified herein.
- C. Related Work Specified Elsewhere:
 - 1. Cast-In-Place Concrete - Section 03 30 00
 - 2. Rough Carpentry - Section 06 10 00
 - 3. Vapor Barrier - Section 07 26 00

1.02 REFERENCE STANDARDS

- A. ASTM C665-84, Type I - Unfaced Fiberglass Insulation
- B. ASTM C578-85, Type IV - Extruded Polystyrene Insulation
- C. ASTM E119 - Time, Temperature Fire Exposure Insulation
- D. ASTM C518-R - Value For Insulation

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver, materials to the job site in original unopened packages, clearly marked with product brand name and manufacturer's labels.
- B. Store under cover and protect from weather and construction activity.
- C. Protect rigid insulation from exposure to direct sunlight.
- D. Protect "skin" surface of rigid insulation from damage. Any insulation with damaged or broken skin shall not be installed.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Batt Insulation - Fiberglass batts, unfaced, friction fit, conforming to ASTM C665, Type I, minimum R-value 3.5 per inch, thickness as shown on drawings. Batt insulation shall be as manufactured by one of the following or approved equal:
 - 1. Owens Corning - Light Density Thermal Insulation
 - 2. Manville - Insulating Blankets
 - 3. United States Gypsum Co. - Thermafiber
 - 4. Certainteed - Unfaced Building Insulation

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. General:

1. Do not proceed with the installation of insulation until the work which follows (and conceals the insulation) is ready to be performed.
2. Comply with manufacturer's instructions and recommendations for the particular conditions or installation in each case.

B. Batt Insulation:

1. Extend insulation full thickness as shown on the drawings, over the entire area to be insulated. Fit insulation between framing members. Cut and fit tightly around obstructions and fill voids with insulation to insure a snug fit.
2. Fill cracks and voids around window and door frames, window mullions and other voids in exterior walls with fiberglass insulation.

END OF SECTION

SECTION 07 90 00 CAULKING & SEALANTS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. Furnish all labor, material, equipment, scaffolding and appliances required to complete all caulking, and related work as specified herein and as shown on the drawings.
- C. 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. Around the frames of Doors, Windows & Louvers - each exposed side.
 - b. Vertical concrete, precast concrete, and masonry control and expansion joints.
 - c. Under door thresholds - at the inside and outside edge of the threshold.
 - d. Flashing reglet terminations.
 - e. Where interior window stools intersect walls and window frames.
 - f. Where exterior window sills intersect walls and window frames.
 - g. All other Joints noted on Drawings as "Caulk" or "Sealant".
 - h. All joints which meet the definition of paragraph "F" above.
 - i. Where exterior window sills intersect walls and window frames.
 - j. Joints in ceramic tile and other hard surface materials.
 - k. All other Joints noted on Drawings as "Caulk" or "Sealant".
 - l. All joints which meet the definition of paragraph "F" above.
 - m. All precast wall panel joints.
 - 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.
 - e. Where HM door frame meets hard surface flooring.
 - 3. Self Leveling Horizontal Urethane:
 - a. Horizontal and sloped expansion joints in concrete walks, paving, floors and decks.
 - b. Horizontal and sloped expansion and control joints in interior hard surface flooring materials.
 - 4. Expanding Foam Polyurethane Sealant:
 - a. Horizontal and vertical Precast Concrete Wall Panel joints for thermal insulating and sound attenuating.

1.02 REFERENCES

- A. Non-sag Urethane:
 - 1. ASTM C920, Type S, Grade NS, Class 50

2. Fed Spec TT-S-00230C, Type II, Class A

B. Interior Silicone:

1. ASTM C920, Type S, Grade NS, Class 25
2. Fed Spec TT-S-001543A, Type Non-sag, Class A

C. Self Leveling Horizontal Urethane:

1. ASTM C920, Type M, Grade P, Class 50
2. Fed Spec TT-S-00227E, Type I, Class A

1.03 SUBMITTALS

- A. Submit manufacturer's product specifications, handling, installation and curing instructions for each type of sealant to be used in accordance the requirements of Division 01.
- B. Submit sample of joint sub-caulking to be used.
- C. Submit color sample of each type of sealant for selection by the Architect. Colors will be selected from the manufacturer's standard line of colors.

1.04 DELIVERY STORAGE AND HANDLING

- A. All materials shall be delivered to the site in their original, unopened containers, clearly labeled with manufacturer's name, brand name, and such identifying numbers as are appropriate.
- B. Store caulking materials in a dry, heated space. Maintain temperature at approximately 70°F.

1.05 WARRANTY

- A. The Contractor shall, and by acceptance of this contract does, warranty that all work executed under this section will be free from defects due to materials and workmanship for a period of five (5) years from the date of "Substantial Completion" and at his own expense, repair and replace all such work found to be defective during the term specified.

PART 2 - PRODUCTS

2.01 CAULKING MATERIALS

- 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 contractors 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. Sika Chemical Co. - Sika-Flex 1a or 2c NS
 2. Sonneborn - Sonolastic NP1 or NP2
 3. Tremco - Dymonic or Dymeric
 4. Pecora - Dynatrol II
- 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. Tremco – Tremsill 200
 2. Pecora – 898 Sanitary Silicone
 3. Dow Corning - 786 Mildew Resistant
- 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
- D. Sprayed Polyurethane Foam Sealant – 1- or 2-component, foamed-in-place, polyurethane foam sealant 1.5 to 2.0 lb/cu.ft. (24 to 32 kg/cu.m.) density; flame spread index of 25 or less according to ASTM E162; with primer and non-corrosive substrate cleaner recommended by foam sealant manufacturer.

2.02 CAULKING ACCESSORIES

- A. Primer - Shall be colorless primer made by manufacturer of sealant and shall be specifically designed as prime coating for the caulking or sealant compound furnished.
- B. Cleaning Fluid - Cleaning fluid shall be methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK) or similar solvent material which will not etch or mar metal finishes, shall be the product of a nationally recognized manufacturer, and shall be of type expressly recommended for use with the caulking or sealant compound used.
- C. Bond Breaker - Bond breaker shall be polyethylene tape, or other approved materials or coated materials providing a bond breaker on the exposed side with a non-smear adhesive on the contact side.
- D. Joint Sub-Caulking - Shall be non-staining, resilient closed cell polyethylene foam rod stock, size to be under at least 25% compression when finally positioned in the joint. Sub-caulking shall be one of the following or approved equal:
1. Williams Products - Expand-O Foam
 2. Sonneborn - Sonofoam Closed-Cell Soft Backer Rod

PART 3 - EXECUTION

3.01 EXAMINATION OF SURFACES

- A. Examine all other work and surfaces to receive the work of this section, and report to the General Contractor all conditions not acceptable. Do not seal joints until they are in compliance with specifications and drawings. Commencement of work will constitute acceptance of all such conditions and surfaces to receive work of this section and lead to a waiver of any subsequent claims to the contrary.

3.02 PREPARATION

- A. Allow a minimum 28 days curing period for concrete, mortar or grout prior to caulking.
- B. Protect areas adjacent to joints as necessary from smear or stain and to facilitate tooling of sealant.

- C. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, asphalt, tar, wax, rust, water, surface dirt and frost, and properly prepare surface to receive the sealant.
- D. Porous materials such as concrete, masonry or stone shall be cleaned where necessary by grinding, sand or water blast-cleaning, mechanical abrading, chemical washing or combination of these methods as required to provide a dry, clean, sound base surface for sealant adhesion.
 - 1. Masonry surfaces to be contacted by sealant shall be made free of sanded surfaces or applied coatings that could be detrimental to sealant bond.
 - 2. Loose particles present or resulting from grinding, abrading or blasting shall be removed by blowing out joints with compressed air (oil free) prior to application of primer or sealant.
- E. Non-porous surfaces, such as metal shall be cleaned of scale, rust and any coatings either mechanically or chemically as required to provide a dry, clean, sound base surface for sealant adhesion.
 - 1. Metal surfaces treated with methacrylate lacquer, bituminous paints or similar protective coatings shall have such coating removed by a solvent that leaves no residue. Previously applied primer must adhere permanently or be entirely removed.
 - 2. Solvent shall be used with clean white cloths or lintless paper towels and wiped dry with clean, dry white cloths or lintless paper towels. Do not allow solvent to air dry without wiping.
 - 3. Joint areas protected with masking tape or strippable films shall be cleaned as above after removal of tape or film.
- F. In general, use primer only where recommended by sealant manufacturer. Primer shall be applied in strict accordance with manufacturer's printed recommendations and instructions and shall be used as it comes from the container.
- G. For all control joints, sealant bond is considered critical and a primer shall be used. Joint primer shall be brush applied to both faces of the joint created and allowed to cure as recommended by the sealant manufacturer.
- H. Do no priming or caulking of joints with surfaces in less than a dry condition.

3.03 APPLICATION - NON-SAG URETHANE

- A. Depth of sealant at the center of its cross section shall be uniform and approximately one half width of sealant with no depth less than one third the width. Depth of sealant at bond interface shall be uniform and approximately equal to width of sealant with no depth less than three quarters the width, except where a bond breaker is used. Backing shall be subcaulking material or bond breaker where subcaulking material is not to be utilized. Maximum depth of sealant is to be 1/2" unless manufacturer provides a special exception.
- B. Whenever mortar joints are to be surface caulked, such as those at ends of lintels, sealant shall be provided with proper backing to obtain the reduced depth of the sealant required at the center of its cross section. Use one-half round joint subcaulking material with non-smear continuous adhesive on its flat face.
- C. Apply sealant in strict accordance with the manufacturer's directions. Apply sealant uniformly with manually operated or air operated air caulking guns, using proper size and shape nozzle tip appropriate for the joint to be treated. Use sufficient pressure to fill all voids and joints solid. Fill joints from the deepest point to the surface by holding the properly sized nozzle against the back of the joint. Work sealant if needed to insure all air is removed.

- D. Tool sealant immediately following gunning. Apply pressure to make intimate contact with the joint faces and achieve a slightly concave joint surface. Caulked joints on flush surfaces shall be neatly finished with a beading tool to a uniform appearance. Remove excess caulking and leave surface neat, smooth, clean and flush at all edges.
- E. Where appearance is considered critical, masking tape shall be applied in continuous strips in alignment with joint edge before applying sealant. Surface of tooled sealant shall be dusted with sand to dull its sheen, or otherwise treated so as to harmonize with the surrounding work in color and texture. This must be done before sealant has developed a skin coat. Carefully remove masking tape immediately upon completion of such operations and clean as required.
- F. Caulking and sealing shall be done only when the temperature is above 40°F. Caulking may be applied in temperatures as low as 20°F if the substrates are completely dry, free of moisture, and clean as described above, and, the caulking materials have been stored at 60°F or above just prior to installation.
- G. Upon completion of caulking work, all joints shall be neat and watertight with sealant material securely bonded to side of joints and unbonded to backing.
- H. Protect newly applied sealant until cured.

3.04 APPLICATION - INTERIOR SILICONE

- A. Apply interior silicone sealant with a hand gun or pressure equipment in strict accordance with the manufacturer's printed instructions. Priming shall be done as required by the sealant manufacturer.
- B. At inside corners caulking shall be laid in a fillet bead with equal amounts of caulking on both the horizontal and vertical surface. Mask each surface to insure a straight even joint.
- C. Fixtures set into a horizontal surface shall have a bead of caulking laid on the surface in the proper location to intersect the mounting flange of the fixture and insure a tight uninterrupted seal. Sealant should be applied in sufficient quantities so that when the fixture is mounted some sealant is squeezed out and is ready for tooling.
- D. Joints shall be tooled immediately after application and masking tape removed. Do not use soap, soapy water or oil as a tooling aid. Excess sealant shall be cleaned off nonporous surfaces while in an uncured state with a commercial solvent as recommended by the sealant manufacturer. On porous surfaces, excess sealant shall be removed by abrasion or other mechanical means.
- E. Sealed joints shall be left undisturbed for a period of at least 48 hours to allow for a proper cure.

3.05 APPLICATION - SELF LEVELING HORIZONTAL URETHANE

- A. Self leveling urethane sealant shall be applied in strict accordance with the manufacturer's instructions. Surfaces shall be prepared as specified above.
- B. Joint surfaces shall be primed with primer as recommended by the sealant manufacturer. Primer shall be applied in a thin, uniform film. Avoid buildup of excess film thickness. Allow approximately 30 minutes drying time before applying sealant. Reapply sealant to all surfaces not sealed in the same day as the primer is installed. Apply masking tape to the sides of the joint before priming and remove before sealant has begun to thicken and set.
- C. Apply proper backing prior to sealant application. At exterior joints where sealant is to be applied over expansion joint material installed under Section 03 30 00 install a polyethylene bond breaker over the expansion joint material. At interior horizontal joints in flooring materials install backer rod as specified herein.

- D. Mix two-component materials in strict accordance with the manufacturer's instructions.
- E. After mixing install sealant. For large joints the sealant may be poured directly from the can. In smaller joints or slope grade applications the joint be filled by flowing the sealant from a bulk-loading gun.
- F. Fill joints from the bottom; avoid bridging the joint, which may form air voids.
- G. Self-leveling grade caulking will form a clean joint surface. Slope grade shall be lightly tooled to smooth out the ripples. On sloped surfaces, tool from the lowest point to the highest.

3.06 APPLICATION – SPRAYED POLYURATHANE FOAM SEALANT

- A. Apply in strict accordance with manufacturers instructions.
- B. Surfaces must be dry, clean and free of dust, dirt, grease and other substances that may inhibit proper adhesion. Spray foam when surface and ambient temperatures are between 60° - 90°F (16° - 32°C). Chemical contents must be between 70° - 90°F (21° - 32°C) before dispensing.
- C. Install exterior non-sag urethane sealant and backer rod, allow sufficient time to cure, then install spray foam polyurethane sealant. Cut sealant back as required to install interior backer rod and non-sag urethane sealant.

3.07 CLEANING

- A. During and upon completion of all caulking and sealant work, remove all excess sealant, smears and related stains or soiling from adjacent surfaces. Methods are subject to the architect's approval. Use of acidic base materials will not be permitted.
- B. On nonporous surfaces, immediately remove excess sealant with solvent moistened cloth.
- C. On porous surfaces allow sealant to cure overnight, and then remove by light wire brushing or sanding.
- D. All finished work shall be left in a neat, clean condition.

END OF SECTION

SECTION 08 11 00 - HOLLOW METAL FRAMES**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install all hollow metal doors and frames and related items to complete the work indicated on the drawings and described in the specifications.
- C. Related Work Specified Elsewhere:
 - 1. Light Gauge Metal Framing – Section 05 40 00
 - 2. Finish Hardware - Section 08 71 00
 - 3. Gypsum Drywall - Section 09 20 00
 - 4. Painting - Section 09 90 00

1.02 REFERENCE STANDARDS

- A. ANSI/SD1-100-91 Specifications for Steel Doors & Frames
- B. ASTM E152-73 Fire Test of Door Assemblies
- C. ANSI A115 Door & Frame Preparation for Hardware
- D. ANSI A156.7 Standard Template Hinge Dimensions
- E. UL 63 Standard for Fire Door Frames
- F. ASHRAE STANDARD 90P Energy Conservation in New Building Design
- G. ANSI A224.1 Criteria for Prime Painted Steel Surfaces for Steel Doors & Frames

1.03 SUBMITTALS

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the requirements of Division 01.
- B. Shop drawings shall include an itemized listing of all openings, elevations of all frame types, and details of all frame sections.
- C. No material shall be fabricated until such drawings have been approved by the Architect.
- D. Shop drawings shall be started immediately following Contract Notice to Proceed to achieve early frame delivery. Shop drawings shall be submitted to the A/E for approval in sufficient detail to assure a comprehensive quality control check. Shop drawing door and frame numbers shall be numbered the same as on the A/E Drawings and Door Schedule.

1.04 QUALITY ASSURANCE

- A. Labeled doors and frames, as called for in the Door Schedule, shall have a physical label affixed to the fire door and frame at an authorized facility as evidence of compliance with procedures of the labeling agency.

- B. All labeled doors shall carry U.L. approved label.
- C. While the Door Schedule is intended to cover all doors and sidelights, furnish all frames, door openings, sidelights and windows, as indicated in the Contract Documents, whether listed in the door schedule or not. If there are any omissions or errors in the door schedule, bring it to the attention of the Architect prior to bid opening for clarification or instructions. No extras are allowed for omissions, changes, or corrections necessary to facilitate a complete installation.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Metal frames shall be handled and stored in a manner that will prevent rusting, distortion or damage of any kind. They shall be stored upright in a protected area on wood runners or skids at least 4 inches high or in a manner that will prevent rust or damage. Frames shall be delivered to the job site with spreaders.
- B. Frames shall be stored in a protective shelter, or under properly vented covers. The use of non-vented plastic or canvas shelters that can create a humidity chamber shall be avoided.
- C. Hollow metal door frames shall be shipped separately to ensure early delivery.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Doors and frames shall be by one of the following manufacturers:
 - 1. American-Standard, Steelcraft
 - 2. Amweld Building Products Div., American Welding & Mfg. Co.
 - 3. Ceco Corp.
 - 4. Curries Mfg. Inc.
 - 5. Fenestra Corporation
 - 6. Kewanee
 - 7. Pioneer Industries Div., Core Ind., Inc.
 - 8. Republic Builders Products Corp.

2.02 MATERIALS

- A. All material for doors and frames shall be cold rolled steel free from scale, pitting, rust or other defects which would impair strength, durability or appearance. All steels used to manufacture door faces shall meet the stretcher level standard for flatness. Steel shall conform to the following:
 - 1. Cold Rolled Steel - ASTM A366 or ASTM A620 and A568.
 - 2. Hot Rolled, Pickled and Oil Steel - ASTM A569 and A568.
 - 3. Hot dipped zinc coated steel shall comply with ASTM A526 or ASTM A642 and A525 with coating weights meeting or exceeding the minimum requirements for A40 for alloyed coatings and G60 for spangled coatings.
 - 4. Electrolytically deposited zinc coated steel for anchors and accessories shall comply with ASTM A591 and A568, minimum weight class "B", 0.075 oz/sq ft.
- B. Doors and frames shall be provided in the following gauges:
 - 1. Interior Frames - 16 gauge
 - 2. Exterior Frames - 14 gauge, galvanized steel or stainless steel

2.03 METAL FRAMES

- A. Construction - All frame sections shall be fabricated to the profiles indicated. All frames shall be one piece all angles, returns and miters continuously electric fully welded to hairline accuracy and ground smooth. All corners shall be full miters, including stops. Butting of stops, or the use of tenons will not be permitted. Knock-down and two-piece metal frames are not allowed.
- B. Reinforcements: Frames shall be reinforced as per Table V of the ANSI/SDI-100-91 manual. Hardware templates and hardware listings will be furnished by the hardware contractor under Section 08 71 00 (Finish Hardware).
- C. Anchorage:
1. Provide 12 gauge angle clips at bottom of all frames, with punched holes for securing to floor construction.
 2. Provide anchors of the type best suited for location, not over 32" apart on all jambs. Anchors shall provide sufficient anchorage to the wall in accordance with ANSI/SDI 119 Test compliance level A of one million cycles or as shown on the drawings for specific wall conditions.
 3. Provide formed spreader bars to hold unsupported ends of frame in alignment during shipping storage and construction.
- D. Accessories:
1. Provide 3 rubber door silencers for strike jambs of each frame. Glynn Johnson GJ-64 or equal.
 2. Provide steel glazing stops, removable, at all sidelites or borrowed lights.
 3. Provide mortar-tight full enclosure steel cover boxes over all mortises.

2.04 FINISH

- A. Frames shall be thoroughly cleaned, and chemically treated to insure maximum paint adhesion. All surfaces of the door and frame exposed to view shall receive a shop applied coat of rust inhibiting primer either air dried or baked on. Prime finish shall meet the requirements of ANSI A224.1 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces".

2.05 HARDWARE PREPARATION

- A. Reinforce, drill and tap frames to receive mortised hinges, locks, latches, flush bolts, concealed closers and other hardware as required. Preparation shall be in accordance with ANSI A115 where applicable.
- B. Field drilling and/or tapping for surface applied hardware shall be by Section 06 10 00.
- C. Reinforcing shall be as noted in Table V of the ANSI/SDI-100-91 manual.
- D. Hardware locations shall be as per Table VI of the ANSI/SDI-100-91 manual. Items not shown in Table VI shall be located according to the manufacturer's directions.

PART 3 – EXECUTION

3.01 INSTALLATION - FRAMES

- A. Install frames plumb, rigid and in true alignment; properly brace until built-in. Any frames not plumb and in true alignment will be rejected and shall be replaced by the Contractor.
- B. Flush and seamless end channel closure pieces at door heads.

END OF SECTION

SECTION 08 14 23 - SOLID CORE WOOD DOORS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. Work under this Section includes all labor, materials, services and equipment necessary to furnish and install all wood doors in accordance with the drawings, schedules and this specification.
- C. Related Work Specified Elsewhere:
 - 1. Light Gauge Metal Framing – Section 05 40 00
 - 2. Metal Frames - Section 08 11 00
 - 3. Finish Hardware - Section 08 71 00

1.02 REFERENCE STANDARDS

- A. N.W.M.A. Industry Standard 1.5-1, 1986
- B. ANSI A208.1 1L1 Mat-Formed Particle Board
- C. AWI Section 1300 - Architectural Flush Doors.
- D. AWI Section 1500 - Factory Finishing, System 3, Premium Grade.

1.03 SUBMITTALS

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the General Conditions. For stock items requiring no modifications or special fabrication to suit the requirements of this particular job, manufacturer's literature and installation instructions will be accepted in lieu of shop drawings.
- B. Submit samples of wood veneer to the Architect.

1.04 QUALITY ASSURANCE

- A. Labeled doors and frames, as called for in the Door Schedule, shall have a physical label affixed to the fire door and frame at an authorized facility as evidence of compliance with procedures of the labeling agency.
- B. All labeled doors shall carry U.L. approved label.

1.05 DELIVERY, STORAGE AND HANDLING

- A. All doors shall be protected and kept under cover and off the ground (minimum 5-1/2" above the ground and 3-1/2" above any other surface) both in transit and at the job site. No doors shall be delivered to the site. No doors shall be delivered to the site unduly long before they are required in the proper conduit of the work, and in no case shall delivery be made until proper storage facilities are available at the site.
- B. Receive and carefully stack doors laid flat and level on three 2x4's one at center and one 12" from each end, in a dry, clean well-ventilated space. Place corrugated cardboard or plywood under bottom doors and over doors. Install doors, in single or double acting frames as shown on drawings.

1.06 GUARANTEE

- A. Doors shall be guaranteed in accordance with the Manufacturers Standard Guarantee for life of door.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Solid Core and fire rated doors shall be 5 ply doors manufactured by the following or approved equal:
1. Algoma Hardwoods
 2. Weyerhaeuser
 3. Eggers
 4. VT Industries
 5. Poncraft Door Company Model PC-HPDL-5

2.02 MATERIALS - FLUSH SOLID CORE WOOD DOORS & 20 MINUTE DOORS

- A. Face Veneers – Wood, Red Oak, Rotary Cut.
- B. Stiles - 1-3/8", 2 ply edge strips glued to core, outer ply (5/8") of species compatible to face veneer; inner ply mill option hardwood.
- C. Top & Bottom Rails - 1-3/8", 2 ply edge strips glued to core-mill option hardwood species. Provide 5" fire rated plywood top rail for mounting closers without through bolts.
- D. Core - Mat formed particle board conforming to ANSI, A208.1-1L1.
- E. Crossbands - 1/16" minimum hardwood.
- F. Glue - Veneer plies hot pressed to core with exterior Type I glue.
- G. Provide lock blocks as required for mounting hardware without through bolts.
- H. Provide mini-blind glass units at classroom doors with operation from classroom side. Units shall be tilt and raise controlled; sizes and location per drawings.

2.03 MATERIALS - FLUSH MINERAL CORE 60 MINUTE DOORS

- A. Face Veneers – Wood, Red Oak, Rotary Cut.
- B. Stiles - 5/8" nominal Superstile.
- C. Top Rail - Top rail reinforced 5/8" white high density material outer with 5" heavy-duty reinforcement.
- D. Bottom Rail - Bottom rail reinforced 3/16" untreated lumber with 5" heavy-duty reinforcement. On pairs of doors with surface applied vertical rod exit devices, provide a reinforcement block in the two lower meeting corners of the doors; rail shall be 5/16" white high density outer with 5" heavy-duty reinforcement.
- E. Core - Weldrok Mineral Core.
- F. Crossbands - 1/16" minimum hardwood.
- G. Glue - Veneer plies hot pressed to core with exterior Type I glue. Core glued to stiles and rails with exterior Type II glue.

2.04 FABRICATION

- A. Styles and rails shall be bonded to the core under side pressure with the high frequency method of cure.
- B. Core and edging shall then be sanded to assure a smooth base for veneers.
- C. Crossbanding and face veneers shall be bonded to the core under pressure.
- D. All doors shall be factory pre-machined and pre-fit for all finish hardware.
- E. Fire rated doors shall have matching plastic laminate edges and glazing stops.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Hang doors in adequately braced and nailed or otherwise secured square and plumb frames with clearances of not more than 1/8 inch at each side and head; clearance at bottom 1/2 inch or as required for floor covering, carpeting or thresholds. After fitting hardware, remove same until all surfaces cut for hardware and ends and edges are sealed. Hang doors in perfect operating condition.

END OF SECTION

SECTION 08 71 00 - FINISH HARDWARE**PART 1 - GENERAL****1.01 WORK INCLUDED**

- A. Furnish all finish hardware specified herein, listed in the hardware schedule, or required by the drawings.
- B. Where items of hardware are not definitely or correctly specified and are 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.

1.02 REFERENCES

- A. ADA - Americans with Disabilities Act
- B. ANSI A117.1 - Specifications for making facilities accessible to physically handicapped people
- C. NFPA 80 - Standards for Fire Doors and Windows
- D. NFPA 101 - Life Safety Code
- E. UL - Building Material Directory
- F. DHI - Recommended Locations for Architectural Hardware
- G. Applicable State and Local Building Codes

1.03 SUBMITTALS

- A. Hardware Submittal - Immediately after award of hardware contract, submit five (5) copies of a detailed hardware schedule using a vertical format.
 - 1. Itemize hardware in the sequence and format established by this specification.
 - 2. List and describe each opening separately. Include all doors with identical hardware, except hand, in a single heading. Include door number, room designations, degree of swing, and hand.
 - 3. List related details. Include dimensions, door and frame material, and other considerations affecting hardware.
 - 4. List all hardware items. Include manufacturer's name, quantity, product name, catalog number, size, finish, attachments, and related details where applicable.
 - 5. Resubmit (5) copies of the corrected schedule when required.
- B. Keying Schedule - After receipt of approved hardware schedule, submit a copy of a proposed keying schedule. Meet with the Owner, if required, to finalize keying requirements.
- C. Samples - If so directed by the Architect, submit samples of finish hardware items for approval. Properly identify each sample as to make and number, and furnish in the specified finish.
- D. Templates - Furnish a copy of approved hardware schedule, along with applicable templates, for factory prepared hardware to each door and frame fabricator as required.
- E. Substitutions - Submit under provisions of Division 01. Provide detailed information and catalog cuts indicating the comparison to the specified hardware. If requested by the Architect, provide a sample of the proposed substitution for review.

1.04 QUALITY ASSURANCE

A. Qualifications -

1. Manufacturer - Except where specified in the hardware schedule, furnish products of only one manufacturer for each type of hardware. Minimum of ten (10) years experience in the manufacture of the item specified.
2. Supplier - A company with a minimum of ten (10) years experience in the builders' hardware industry.

B. Regulatory Requirements -

1. Furnish UL or Warnock Hersey listed hardware for all fire rated and 20 minute openings in conformance with requirements for the class of opening scheduled, whether specifically called for in this specification or not.
2. Furnish hardware that conforms to all applicable state and local building codes. Where specified hardware is not in conformance with applicable codes, such omission or error should be directed to the Architect prior to the bid date for clarification by addendum, otherwise furnish hardware as required by code.

1.05 DELIVERY, STORAGE & HANDLING

- A. Deliver, store and handle in accordance with Division 01. Mark each original container to correspond with the approved hardware schedule for the installation location.
- B. Receive, inventory, and store hardware in a secure and dry environment; protect against loss and damage.
- C. Report any shortages to the hardware supplier no later than 48 hours after receipt of delivery to the job site.
- D. Stockpile items sufficiently in advance to ensure their availability. Coordinate delivery, handling and installation of hardware items to ensure orderly progress of total work and minimize or eliminate losses and damage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products	Specified	Acceptable
Hinges	Hager	McKinney, Stanley
Flush Bolts	Ives	DCI, Hager
Locks & Latches	Schlage	
Coordinators	Ives	DCI, Hager
Door Closers	LCN	

2.02 HINGES

- A. Acceptable manufacturers and respective catalog numbers:

Description	Hager	McKinney	Stanley
Std. Wt. Ball Bearing - Steel	BB1279	TB2714	FBB179
Std. Wt. Ball Bearing - Non-Ferrous	BB1191	TB2314	FBB191
Hvy. Wt. Ball Bearing - Steel	BB1168	T4B3786	FBB168

Hvy. Wt. Ball Bearing - Non-Ferrous BB1199 T4B3386 FBB199

1. Continuous Hinge to be Hager 790-905 or approved equal.
- B. Quantity - Furnish hinges for each door leaf as follows, unless otherwise noted in groups:
1. All exterior and vestibule doors up to and including 90" high - 4 hinges
 2. Interior doors up to and including 90" high - 3 hinges
 3. Doors between 90" and 120" high - 4 hinges
 4. Provide one additional hinge for every additional 30 " in height over 120"
 5. Dutch Doors - 4 hinges
- C. Type - Furnish as follows, unless otherwise noted in groups:
1. Standard weight, ball bearing hinges (BB1279) for interior openings through 40" wide.
 2. Standard weight, ball bearing hinge stainless steel, (BB1191) as required, for all.
 3. Pool areas and corrosive areas as scheduled.
 4. Heavy weight, 4 ball bearing hinge (BB1168) for interior openings over 40" wide, and for all vestibule doors.
 5. Heavy weight, 4 ball bearing hinge, stainless steel, bronze, or brass (BB1199) as required, for all exterior openings.
- D. Size - Furnish as follows, unless otherwise noted in groups:
1. 1-3/4" doors: 4-1/2" x 4-1/2"
 2. Provide proper hinge width to clear trim and allow full 180-degree swing where required.
- E. Hinges for all exterior doors opening outward shall have non-removable pin (NRP). All other hinges shall have non-rising pins.
- F. Provide all hinges with flat button tips unless otherwise noted in groups.

2.03 FLUSH BOLTS

- A. Acceptable manufacturers and representative catalog numbers:

Description	DCI	Ives	Hager
Manual - Wood Door	790F	358	283D

- B. Furnish a dustproof strike (DP2) for all bottom bolts.

2.04 LOCKS & LATCHES

- A. Acceptable manufacturers and respective catalog numbers:

Match existing hardware in building; coordinate keying requirements with Owner.

- B. Function to be as per Schedule.

- C. Furnish lock types and functions as specified in the hardware schedule and as follows:

1. Provide 2-3/4" backset.
2. Provide wrought box strike for installation in a wood door or frame.
3. Provide ANSI A115.2 strike for installation in a hollow metal door or frame.
4. Strike lip length shall be sufficient to protect trim, but not to project more than 1/8" beyond trim, frame, or inactive leaf.

5. Furnish abrasive coating on outside levers that lead to loading platforms, stages, mechanical and electrical rooms, stairs other than exit stairs and other hazardous locations as required.

D. Internal electrified functions, when called for in groups, shall be as modified by the lock manufacturer.

2.05 DOOR CLOSERS

- A. Acceptable manufacturers and respective catalog numbers:

LCN – 4040 H-CUSH

- B. Furnish complete mounting brackets, drop plates, spacers, special shoes, and thru bolts as may be required by the door and frame conditions.

2.06 DOOR HARDWARE FINISHES

- A. Unless indicated otherwise in the groups, provide finishes as follows:

Match Existing

2.07 KEYING

- A. Coordinate keying request with Owner.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine doors, frames and related items for conditions that would prevent the proper application of finish hardware. Notify Architect of any conditions that would inhibit the proper installation of hardware. Do not proceed until defects are corrected.

3.02 INSTALLATION

- A. Install each hardware item in strict compliance with the manufacturer's printed instructions and recommendations, using only fasteners supplied by, or called for by, the manufacturer.
- B. Set units level, plumb and true to the line and location. Prepare and reinforce the attachment substrate as necessary for proper installation and operation.
- C. Mortise and cut to close tolerance and conceal evidence of cutting in the finish work. Drill and countersink doors that have not been factory prepared for anchorage fasteners.
- D. If manufacturer's instructions do not call out a mounting location, refer to the Door and Hardware Institute's publication *Recommended Locations for Architectural Hardware*. Install wall stops to engage levers or pulls.
- E. Deliver to the Owner one (1) complete set of installation and adjustment instructions, as well as all tools that were furnished with the hardware.
- F. Refer to exterior elevations for location of Knox-Box.

3.03 ADJUSTMENT & CLEANING

- A. At final completion, adjust and check each operating item of hardware at each door to ensure proper operation and function of every unit. Lubricate any moving parts that do not operate freely, smoothly,

and quietly using only lubricant as recommended by the manufacturer of the hardware item. Replace units that cannot be adjusted or lubricated to operate properly.

- B. Instruct the Owner' personnel in the proper adjustments of the hardware as needed.
- C. Clean and restore hardware to the original finish.

3.04 HARDWARE SCHEDULE

GROUP 1 - Door 100

Latchset –Classroom Function

Closer – LCN 4040 H-CUSH

Butts

Smoke Gasket

Manual Flush Bolt

Dustproof Strike

END OF SECTION

SECTION 09 20 00 - GYPSUM DRYWALL**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this section.
- B. The work required under this Section shall include all labor, materials, services and equipment necessary to furnish and install all gypsum drywall, metal framing studs, accessories and to do all drywall taping. All work shall be in accordance with the drawings and as specified herein.
- C. Related Materials Specified Elsewhere:
 - 1. Light Gauge Framing – Section 05 40 00
 - 2. Caulking & Sealants - Section 07 90 00
 - 3. Painting - Section 09 90 00

1.02 REFERENCE STANDARDS

- A. ASTM C36 Type X Gypsum Wallboard
- B. ASTM C475 Joint Compound
- C. ASTM C1047 Accessories
- D. ASTM C645 Steel Studs
- E. ASTM C525 Galvanized Coating
- F. ASTM C1002 Screws
- G. ASTM C79 Type X Exterior Gypsum Sheathing

1.03 DELIVERY STORAGE AND HANDLING

- A. All materials shall be delivered to the site in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the job site.
- B. Gypsum wallboard shall be stored on edge, long dimension.

1.04 SCHEDULING

- A. Gypsum wall board shall not be installed or finished until temperatures within the building can be maintained within the 55 degree to 70 degree range. Adequate ventilation shall be provided to carry off excess moisture.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Gypsum drywall, accessories and framing systems shall be by United States Gypsum, Gold Bond, Georgia Pacific or approved equal.

2.02 GYPSUM DRYWALL

- A. Gypsum Drywall - 5/8" or as shown on drawings gypsum wallboard, type X designation, with tapered edge. Gypsum Drywall shall be as manufactured by one of the following or approved equal:
 - 1. United States Gypsum - Firecode C
 - 2. Gold Bond - Fire-Shield; conforming to ASTM C36 type X

3. Georgia Pacific - Fire-Stop Gypsum Board

2.03 NON-LOAD BEARING STEEL FRAMING

- A. Refer to Section 05 40 00.

2.04 ACCESSORIES

- A. Drywall Screws - Type "S" self drilling screws as follows:
 1. 3/8" long for fastening studs to track.
 2. 1-1/8" long for fastening wallboard to studs, 3" for double layer attachment.
- B. Corner Bead - 1-1/4" x 1-1/4" galvanized steel with perforated flanges, conforming to ASTM C1047.
- C. Casing Bead - Galvanized steel for 5/8" wallboard or as required, type that requires joint treatment, conforming to ASTM C1047. Casing bead shall be part of the total drywall system as manufactured by one of the following or equal:
 1. Gold Bond - No. 100 casing bead
 2. United States Gypsum - 200 Series, No. 200-A-J
- D. Control Joint - Control joint shall be a vinyl extrusion conforming to ASTM C1047 or roll formed zinc. Control joint shall be as manufactured by one of the following or approved equal:
 1. Gold Bond - E-Z Strip Expansion Joint
 2. United States Gypsum - Sheetrock Zinc Control Joint No. 093
- E. Acoustical Sealant - one part, butyl, non-drying, non-hardening, non-migrating, permanently flexible acoustical sealant. 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
- F. Sound Insulation - Fiberglass batts, unfaced, friction fit, conforming to ASTM C665, type I, 3-1/2" minimum thickness. Sound insulation shall be as manufactured by one of the following or approved equal:
 1. Owens Corning - Sound Attenuation Batt Insulation
 2. Certainteed - CertaSound Acoustical Insulation

2.05 TAPING & FINISHING MATERIALS

- A. Joint Tape - Center creased for folding with edges of each side buffed for better bonding.
- B. Joint Compound - Pre-mixed, vinyl based, all purpose compound.

PART 3 - EXECUTION

3.01 EXAMINATION OF SURFACES

- A. This Contractor shall thoroughly examine all surfaces which are to receive his materials and report any defects in same to the Architect in writing. The Architect will cause defects to be corrected. Starting of any work will imply acceptance, by this Contractor, of the surfaces as suitable to receive his materials.

- B. All work shall be accomplished with mechanics thoroughly skilled in the application of the specified materials and workmanship shall be the very best of which they are capable. Any directions furnished by the manufacturer regarding the installation of his materials shall be faithfully followed.
- C. Maintain a uniform room temperature between 55 degrees F. and 70 degrees F. in cold weather during application and until completely dry or occupied. Provide adequate ventilation.
- D. All gypsum drywall surfaces shall be taped, sanded and left in a condition suitable for a painters finish.

3.02 INSTALLATION - WALLBOARD PARTITIONS

- A. Gypsum wallboard shall be cut by scoring and breaking, or by sawing, working from the face side. Where board meets projecting surfaces, it shall be scribed neatly.
- B. Gypsum boards of maximum practical length shall be used so that an absolute minimum number of joints occur. Boards shall be brought into contact with each other but not be forced into place.
- C. Wallboard joints at openings shall be located so that no end joint will align with edges of opening. End joints shall be staggered, and joints on opposite sides of a partition shall not occur on the same stud. Wallboard joints shall not occur within 12" of the corners of door frames.
- D. Wallboard shall be installed with its long dimension parallel to studs. Butt joints shall be located over center of studs. Joints on opposite sides of partitions shall not occur on the same stud. End joints shall be staggered. Wallboard shall be attached to studs with 1- 1/8" self-drilling drywalls screws, spaced 12" on center in the field of the board; 8" on center at butt joints, and not less than 3/8" from edges.
- E. Corner beads shall be installed at all outside corners. Casing beads shall be installed where wallboard surface butts against other material.
- F. Gypsum wallboard installer shall cut and fit wallboard around all ductwork that passes through wallboard.
- G. Install acoustical sealant in locations as follows:
 - 1. 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.
 - 2. 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.
 - 3. 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.
- H. Install acoustical insulation in partitions as shown on the drawings. Extend insulation full thickness over the entire area to be insulated. Fit insulation between framing members. Cut and fit tightly around obstructions and fill voids with insulation to insure a snug fit. Fill cracks and voids around outlet boxes and other built-in wall accessories.

3.04 CONTROL JOINTS

- A. Gypsum panel surfaces shall be isolated with control joints or other means where:
 - 1. Partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
 - 2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
 - 3. Construction changes within the plane of partition or ceiling.

4. Partition or furring run exceeds thirty feet.
 5. Ceiling dimensions exceed fifty feet in either direction with perimeter relief, thirty feet without relief.
 6. Exterior soffits exceed thirty feet in either direction.
 7. Where wings of "L", "U" and "T" shaped ceiling areas are joined.
 8. Where expansion or control joints occur in the exterior wall.
- B. 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 00.
- C. 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 00 as appropriate to the condition.
- D. Control joints in fire rated construction shall be formed with double studs and expansion joint former and backed with safin insulation as specified under Section 07 84 00.

3.05 JOINT AND CORNER FINISHING

- A. Joint compound shall be thoroughly mixed in accordance with manufacturer's printed instructions.
- B. Uniform thin layer, approximately 4" wide, shall be applied over joint. Center tape over joints and embed in the compound leaving sufficient compound under tape to provide bond. Apply first layer of compound to screw head dimples.
- C. After compound is thoroughly dry, tape shall be covered with layer of compound spread over tape approximately 3" on each side of tape and feathered out at the edges. Apply second layer of compound to screw head dimples. Apply first layer of compound to corner beads.
- D. After compound is thoroughly dry, apply final layer of compound over tape slightly crowned over joint and edges feathered out approximately 3" beyond preceding coat. Apply final layer of compound to screw head dimples. Apply final layer to corner beads, feathered out on both sides approximately 9" from exposed metal nose. Apply smooth feathered layer at casing beads.
- E. Sand, where necessary, following application of each layer of compound. Take care not to roughen paper surface of wallboard. All wallboard and treated areas shall be smooth and ready for decoration.

END OF SECTION

SECTION 09 65 00 RESILIENT FLOORING**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all resilient flooring required to complete the work in accordance with the drawings, schedules and this specification.
- C. Related work specified elsewhere:
 - 1. Cast-In-Place Concrete - Section 03 30 00
 - 2. Carpeting - Section 09 68 00

1.02 REFERENCE STANDARDS

- A. ASTM E-648 Class 1 Radiant Flooring Panel
- B. ASTM E-84 Class A Flame Spread
- C. ASTM E-662 Smoke Density

1.03 SUBMITTALS

- A. Submit samples of each type, color and pattern of resilient flooring. Architect will select colors from standard stock colors.

1.04 DELIVERY STORAGE AND HANDLING

- A. Deliver all materials to the site in original manufacturer's unopened containers, with labels showing manufacturers name and product contained therein.
- B. Store materials in a protected area, sufficiently heated to prevent adhesives from freezing.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Rubber Base – Roppe, Johnsonite, Mannington
- B. Accessories - Armstrong, Tarkett, Mercer Products Company, Inc. or approved equal.

2.02 MATERIALS - VINYL TILE & BASE

- A. Rubber base shall rubber topset type 1/8" thick with round top and coved bottom with preformed corners. Base height as shown on drawings. Base shall be as manufactured by one of the following or approved equal:
 - 1. Roppe
 - 2. Johnsonite
 - 3. Mannington

2.03 ADHESIVES

- A. Adhesives for all floor tile and base materials shall be as recommended by the tile manufacturer for this

installation.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Sand or grind subfloors to remove mortar, paint and other surface irregularities.
- B. Where leveling is required, apply latex type underlayment in two or more applications. Apply compound in accordance with manufacturer's printed instructions.
- C. Remove all debris, sand and other materials which result in lack of adhesion or telegraphing.

3.02 INSTALLATION - BASE

- A. Install base in strict accordance with the manufacturer's instructions. Base shall be tight to the floor, level at the top and neatly scribed at splices.

3.03 FINISHING & CLEANING

- A. Perform the following initial cleaning operations immediately upon completion of resilient flooring.
 - 1. Sweep or vacuum floor thoroughly to remove any loose dirt, dust and other foreign materials.
 - 2. Scrub floor surface using a buffing machine with a 450 or less RPM maximum speed along with a solution of lukewarm water and mild stripper (pH 9 maximum). After scrubbing is complete, wet-vac surface with heavy duty commercial wet vacuum. Rinse floor thoroughly with clean lukewarm water and again wet-vac surface to remove all excess water.
 - 3. Do not scrub floor with steel wool pads, wire brushes, aggressive floor cleaners or cleansers. These products can cause severe scratching and damage to the floor surface.

3.04 ADJUSTMENTS

- A. This Contractor shall inspect, and make necessary adjustments within thirty (30) days after floor tile has been cleaned. All tile that have not seated in a level plane with surrounding tile shall have heat applied locally and shall be quickly rolled to the surrounding level of floor tile. All tile showing broken corners or fracture lines across their surfaces shall be carefully removed and replaced with new tile of same color and thickness.

3.05 PROTECTION

- A. Protect resilient sheet flooring against damage during construction period to comply with resilient sheet flooring manufacturer's directions. Keep furniture off the floor for 24 hours. Do not allow rolling carts to be used on the floor for at least 72 hours.

END OF SECTION

SECTION 09 90 00 - PAINTING**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provision of Division 01 apply to all work of this Section.
- B. The work to be done under this Section includes all materials, labor, equipment, and services necessary to, and reasonable applicable to, providing and applying all paints, varnishes, coatings or other related materials specifically called for in this specification or in the drawings.
- C. The purpose of this painting specification is to clearly indicate the surfaces to be painted or coated, the types and qualities of paints or coatings to be applied and the amount of material to be applied for each coat.
- D. No finish work is required by this Contractor on the following items; however, he shall be required to protect same from damage as specified herein:
 - 1. Finish hardware items, except those primed.
 - 2. Items of brass, bronze, chrome plating, stainless steel.
 - 3. All other finish materials not requiring a painter's finish, as resilient flooring, acoustical materials, casework etc.

1.02 SUBMITTALS

- A. This Contractor shall submit for Architect approval a list of all materials with identifying numbers of codes he proposes to use on this project. This list is to be submitted at least 10 days prior to the application of any paint or coating. Architect approval is required before delivery of any paint or coating to project site. This will in no way take precedence over paragraph on substitutions, 1.03.
- B. At the time contractor furnishes material listing to Architect he shall also submit color chip samples of all products he intends to use on this project.
- C. As requested by the Architect, submit duplicate samples of all painted, varnished, stained, or other specified finishes for approval before starting any work.
- D. Architect will furnish this contractor a set of color chips and a schedule locating all color placement, from samples furnished by contractor.

1.03 SUBSTITUTIONS

- A. The materials or products specified herein and indicated on drawings or finish schedules by trade name shall be provided as detailed.
- B. This contractor shall submit his bid based on specified materials of approved manufacturer listed in Paragraph 2.01.
- C. Equal quality products of other manufacturers will be considered for approval if the request is submitted within 30 days after painting contract award. This written request must include all necessary supporting information and data for Architect to determine equal quality characteristics. Submit through general contractor for Architect approval.
- D. After Architect approval of material, there shall be no substitutions.

1.04 DELIVERY STORAGE AND HANDLING

- A. All materials shall be delivered to the building in the original containers, with labels intact and seals unbroken. No materials other than those specified shall be delivered to the building. All material shall be used strictly in accordance with manufacturer's directions.
- B. Storage of Painting Materials:
 - 1. General contractors will assign a lockable area or room for storing all this contractor's supplies and equipment.
 - 2. All job site tinting, mixing, and thinning required or approved by Architect must be done in this area.
 - 3. This contractor must use adequate means and take all precautions to prevent fire, explosions and other damage caused by his materials and equipment.
 - 4. This contractor must use adequate means and take all precautions to protect floors and other surfaces of this area from damage.
 - 5. All rags and paint or solvent must be stored in closed metal containers at all times.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Except as otherwise specified or detailed herein, or specifically approved by the Architect in writing, the paints or coatings used on this project are to be equal quality and type products of the following manufacturers:
 - 1. PPG Industries, Inc (Pittsburgh Paints)
 - 2. Pratt-Lambert Inc.
 - 3. Benjamin Moore & Co.
 - 4. Sherwin Williams
- B. The finish schedule will list for specifying purposes, the factory number and brand name of Sherwin Williams.
- C. Only top quality materials are to be used on this project. Where a question of quality occurs, the painting contractor will submit an affidavit from the material manufacturer stating the quality range of the project to be used, as compared to other quality products made by that manufacturer.
- D. All materials not specified but required for successful application of any specified paint or coating must be of the brand and type recommended by the approved paint or coating manufacturer. The approved manufacturer's complete coating system will be used on this project, with no substitutions. When materials of manufacturer are specified and these have been discontinued by the manufacturer - only substitutions as recommended by that approved paint or coatings manufacturer will be acceptable to the Architect.
- E. Surface preparation cleaners and degreasers shall be as manufactured by Great Lakes Laboratories, Inc.; 12780 Wayne Road, Livonia, Mi 48150, (313) 525-8300.

2.02 SCHEDULE OF FINISHES

- A. Interior Ferrous Metals

1 Coat SW DTM Primer/Finish

B66W1

	2 Coats	SW DTM Acrylic Semi-Gloss	B66-211 Series
B. Heating Units and Piping			
	1 Coat	SW DTM Primer/Finish	B66W1
	2 Coats	SW DTM Acrylic Semi-Gloss	B66-211 Series
C. Interior Gypsum Board (Paint)			
	1 Coat	SW ProMar 200 Primer	B28W8200
	2 Coats	SW ProMar 200 Eg Shel	B20W600 Series
D. Concrete Block and Concrete (Paint)			
	1 Coat	SW PrepRite Block Filler	B25W25
	2 Coats	SW ProMar 200 Eg Shel	B20W600 Series

2.03 MIXING & TINTING

- A. Job site tinting of finish coats is to be done only when approved by Architect.
- B. All tinting colors are to be of type recommended by manufacturer of paint or coating whose products are used on this project.
- C. Thinning is to be done only when specifically allowed by manufacturer and never to exceed his directions.
- D. All tinting, thinning and mixing must be done in room designated for the storing and mixing of paint.

2.04 SURFACE PREPARATION PRODUCTS

- A. General Cleaning Solution: Great Lakes Laboratories, Inc. - No Rinse Repaint Cleaner
 - 1. One-step Cleaning of: Aluminum, Vinyl, Steel, Wood Siding, Decking, Bar Joists, Block Walls, Interior Walls, Woodwork, Galvanized Steel.
 - 2. Solvent replacement for cleaning metal surfaces before painting.
- B. Heavy Duty Cleaning Solution: Great Lakes Laboratories, Inc. - Extra Muscle Repaint Cleaner
 - 1. Removing chalk from painted siding.
 - 2. Solvent replacement used in place of trichlor, lacquer thinner, mineral spirits, and other solvents for cleaning metal surfaces.
 - 3. Paint and stain remover, concentrate will soften and remove many water-borne paints and stains.
- C. Degreasing: Great Lakes Laboratories, Inc. - All Purpose Repaint Degreaser
 - 1. Cleaning and degreasing metal, offers short term rust inhibition.
 - 2. Non-emulsifying feature will float oily contaminants to the surface of collected solutions. The oil can be skimmed off and the cleaning solution can be reused or sewerred.
- D. Cleaning & Etching: Great Lakes Laboratories, Inc. - Clean & Etch
 - 1. For one-step cleaning and etching of concrete, steel and galvanized.

2. Derusts steel and iron and removes corrosion from aluminum.
3. Prepares galvanized surfaces for application of paint.

PART 3 - EXECUTION

3.01 EXAMINATION OF SURFACES

- A. Before starting any work, this Contractor shall examine all surfaces which are to receive his materials and report all defects found in same to the Architect in writing. The starting of any work by this Contractor will imply his acceptance of the surfaces as suitable for the application of his materials.
- B. An exception to "A" above will be allowed if this contractor wishes to perform a test application to a questionable surface. If the surface fails to hold paint material, Architect shall be notified in writing and no additional material applied until defective surfaces have been corrected.

3.02 PREPARATION OF SURFACES

A. ALL SURFACES

1. All surfaces to which paint is applied shall be clean and dry. No painting will be permitted in dusty rooms, and, if required by the Architect, the painter shall sprinkle floors to lay the dust. No painting or varnishing shall be done on interior work unless the temperature is above 60°F.
2. All surfaces must be free of foreign matter before applying any paint or coating. Removal of foreign matter from painting surfaces left by other trades shall be the responsibility of the General Contractor.

B. NEW UNPAINTED METALS

1. All bare metal surfaces (unprimed from the fabricator) shall be thoroughly washed with Great Lakes Laboratories, Inc. - All Purpose Prepaint Degreaser and wiped clean with rags before priming.
2. Before painting, all metal surfaces shall be thoroughly cleaned of all dirt, oil, rust, scale and other foreign materials by the use of sandpaper, steel scrappers, or wire brushes as necessary.
3. Metal door frames are to have countersunk screws filled and sanded smooth before prime coat or under coat is applied.
4. Galvanized steel surface requiring painting must be cleaned with Great Lakes Laboratories, Inc. - Clean and Etch to remove all traces of grease or oil before priming as per specifications.

C. NEW PLASTER, DRYWALL, MASONITE OR HARDBOARD

1. Surfaces to be coated must be dry and clean, free of dirt, oil and grease. Cracks, gouges or other surface imperfections shall be repaired by spackling or puttying, depending on the surface. Allow spackling to dry thoroughly before spot priming.
2. Remove oil or grease with Extra Muscle Prepaint Cleaner. Remove dirt and grime with No Rinse Prepaint Cleaner.
3. If surface to be coated is slick or shiny, use medium sandpaper or liquid deglossing compound to remove the shine. Wipe thoroughly with clean rags to be sure the surface is clean.

4. Plaster surfaces shall be allowed to dry for at least thirty (30) days prior to painting.

D. PREVIOUSLY PAINTED PLASTER

1. Precautions should be taken when patching cracks in old plaster that has been repainted. The texture of the patch should match the adjacent surface to prevent a darker or lighter color from appearing in the finished coat. If the adjacent surface is smooth, sand the patch to a comparable smoothness. If the wall is textured, roughen the surface to approximate the previous painted appearance. Feather all edges of the patch to blend in with the surrounding surfaces.
2. The patched areas shall be thoroughly dry before priming.
3. Before repainting the entire wall, the patched areas shall be spot coated over the primer, using the same paint as the finish coat.

E. PREVIOUSLY PAINTED MASONRY OR CONCRETE

1. All surfaces must be free of dirt, grease, form oil or wax, all loose or chalky deposits, parting membrane, and efflorescence. Point up cracks, voids or other surface fissures.
2. All glossy areas shall be dulled with sandpaper or surface conditioner to facilitate adhesion of paint.
3. Non-moving breaks or defects in masonry or concrete surfaces shall be repaired. Cracks or breaks shall be repaired with a water-mixed grouting as a filler. The crack shall be thoroughly wet before applying the filler to prevent dry masonry from absorbing the water in the filler.
4. Deep, moving cracks in masonry or concrete surfaces shall be partially filled with grout, followed by an application of an elastic caulking compound. Do not overlap caulking onto the surface edges of the crack.
5. Efflorescence must be removed, the cause repaired or corrected and the surface treated before painting can begin. Remove efflorescence by either scraping, chipping or sandblasting.
6. If existing paint is chalky, soft or powdery, but in good condition, surface should be washed thoroughly and primed with PPG Speedhide Masonry Surface Sealer-Oil 6-8.

F. PREVIOUSLY PAINTED MATERIALS

1. Remove all oil, grease or similar contaminants with No Rinse Prepaint Cleaner, Extra Muscle Prepaint Cleaner or All Purpose Prepaint Degreaser as required. Follow their label directions. Let surface dry before painting.
2. Clean thoroughly, remove corrosive deposits and rust by scraping, sanding or other suitable means and allow to dry. Dust thoroughly to get surface clean. Spot prime all bare metals with primer prior to painting.
3. Dull all glossy areas with sandpaper or use a liquid deglossing compound and wipe clean.
4. Galvanized Metals - Wash all previously painted galvanized surfaces with Clean & Etch to remove grease and deposits. If the galvanized surface is broken and rust is evident, remove rust to the bare metal by wire brushing, sanding or blasting. Clean thoroughly and spot prime with rust inhibitive primer. When spots have dried, prime with galvanized steel primer.

3.03 PROTECTION

- A. Lay drop cloths in all areas where painting is being done to protect floors and other work from damage. Remove all electric outlet plates, fixture canopies, surface hardware and other similar items before painting is begun and replace same after completion. Where it becomes necessary, in order to execute the work under this section, to remove the protective coverings placed by other trades, this Contractor shall replace same afterward in a proper manner. Any work of other trades, damaged in executing the work under this section, shall be replaced or restored to the original condition at this Contractor's expense.

3.04 WORKMANSHIP

- A. Paint or coatings are to be applied under conditions conducive to good results. It is necessary for this contractor to honor the individual requirements of each material used, as to digestion time, pot life, application temperature limits, humidity limits where applicable, and manufacturer's directions.
- B. If this contractor finds that problems are arising in connection with the application of the paint to a surface so as to prevent him from doing a good workmanlike job, painting on that area should be stopped immediately. The supplier of the paint should then be contacted to see what can be done to rectify the conditions.

Plaster, mortar, concrete block, concrete or any other masonry related surface shall not be painted if its moisture content exceeds 12%. If moisture content is between 8% and 12%, prime with Alkali Resistant Primer in place of specified primer.

- C. All pipes, insulated pipes, ductwork and equipment in exposed areas shall be painted.
- D. All doors to be painted must have at least two coats of finish paint after doors have been fitted. Doors shall be removed from frame during application.
- E. Where open cabinets and shelves occur, room finish on walls shall not be omitted except in back of permanent cabinets with closed backs.
- F. The contractor must furnish all required ladders, stages, scaffolds, etc., and they must be in safe condition, having adequate strength to support maximum work load.
- G. Scaffolds, ladders, etc., must not be left up where they would interfere with other workmen, when not in daily use.

3.05 APPLICATION

- A. Final coat of paint or coating must have visual evidence of solid hiding and uniform appearance.
- B. There shall be no visible evidence of runs, sags, curtains or other evidence of poor application.
- C. All coats shall be thoroughly dry before applying succeeding coats, unless specifically exempted by material manufacturer.
- D. Make edges of paint or coating adjoining other materials or colors, sharp and clean, with no overlapping.
- E. When paint or coating is brush applied, proper skill must be used to avoid all signs of lapping and excess paint from edge of roller. When cutting in with a brush is required, these areas must be of same texture, color and hiding as adjacent areas, to assure good appearance.
- F. When paint or coating is applied by spray, it must be done before the installation of fixtures hardware, flooring and other finish items unless thoroughly protected. It shall be applied only by skilled painters, to assure a uniform finish with no evidence of poor or improper application.

- G. Block filler when applied to concrete or lightweight block must retain no block surface texture, only pattern from brush or roller and shall have no pinholes.
- H. Exposed piping, conduit, wiremold, ductwork, hangers and related or similar materials shall be painted the color and texture of the wall or ceiling adjacent. The purpose is to visually hide the exposed material. Then adjacent surfaces are unpainted, match the general color. Exception: where special pipe color coding is specified.
- I. Each coat of paint or coating shall be of visible difference from preceding coat.
- J. Each coat of paint or a coating shall be inspected by Architect or his representative before next coat is applied. Only after inspection and approval will credit be given for that coat.
- K. Each coat of paint to be applied uniformly with proper spreading rate listed by the approved paint manufacturer.
- L. Spot painting to correct soiled or damaged paint surfaces will be allowed only when touch-up spot is blended into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.
- M. Contractor shall note that this project calls for complete painting of all work requiring paint on interior of building and as called for in the Room Finish Schedule. In areas where patching of walls are indicated, paint the complete wall from corner to corner or visible stopping point. Colors of paint shall match existing in that area.

3.06 MECHANICAL AND ELECTRICAL INSTALLATIONS

- A. All exposed radiators, radiator covers or enclosures, exposed heating pipes or similar items subjected to excessive heat, shall be painted with two coats of heat resistant paint or radiator paint. Where color must match adjacent surfaces and a wall paint is specified for use on radiators or piping, only a flat oil paint or eggshell enamel shall be used and coats shall be as thin as possible to minimize blistering and flaking. Heat shall not be turned on full until the finish is thoroughly hardened.
- B. All exposed piping covering and mechanical insulations shall be given two coats of interior paint to match adjacent surfaces. Add to each coat a fungicidal agent which will render the fabric mildew-proof, but not adversely affect the color, texture or durability of the paint.
- C. All other exposed Mechanical or Electrical ducts, pipes, conduits or equipment shall be primed and painted two coats of paint. In finished spaces, the color shall be neutral gray or color selected by the Architect.

3.07 CLEANING-UP

- A. Upon completion of his work this contractor shall clean off all paint where it has spilled, splashed or splattered on floors, walls, woodwork, fixtures, glass, hardware, etc., and leave the entire building in perfect condition thoroughly cleaned and ready to use.
- B. This contractor must leave premises clean and free from all rubbish and accumulated material left from his work.

END OF SECTION

SECTION 10 73 00 SOLAR WALL PANELS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install all Wall Panels as shown on the drawings and specified herein.
- C. Related Work Specified Elsewhere:
 - 1. Caulking & Sealants – Section 07 90 00
 - 2. Division 23 - HVAC

1.02 SYSTEM DESCRIPTION

- A. The fresh air required in the building will be drawn through the entire solar panel, become heated, and then distributed throughout the building by a conventional distribution system. The panels consist of perforated metal sheet absorbers mounted out from the main wall, which forms the exterior of the solar panel. System is to include all necessary flashing and coping to provide a complete solar wall system.

1.03 SUBMITTALS

- A. Prepare and submit shop drawings to the Architect for approval in accordance with the General Conditions. No material shall be fabricated until such drawings have been approved.
- B. Submit samples of color selections on metal from the manufacturer's standard line of colors to the Architect for selection.

1.04 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver, store and handle solar wall panels in a manner that will prevent damage of any kind.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Solar wall panels shall be as manufactured by Inspire Wall by ATAS International, Inc., or approved equal.

2.02 MATERIALS

- A. Solar Wall Panels: Solar wall panels shall be fabricated from the following:
 - 1. SW-100R profile solar wall panels, 0.032 aluminum inspired wall panel, standard color (color to be determined). Medium flow rated. Cut to length where practical.
 - 2. Required perimeter and canopy flashing.
 - 3. 18-ga G90 galvanized steel framing; formed framing material, for plenum, and structural support.
 - 4. Required fasteners to attach solar wall panels and flashing, self-drilling screws, painted heads to match color of solar panels. Washered as required.

5. Required fasteners to construct framing for solar wall, plated self-drilling screws.
6. Profiled foam closures matching the solar wall panels profile as required.
7. Standard installation drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install solar wall panels in locations shown on drawings in strict accordance with the manufacturer's instructions.
- B. Panels shall be erected plumb and level in the space provided for the panel.

3.02 WARRANTY

- A. Manufacturer warrants that all products supplied by manufacturer are free of defects for a period of 12 months from the date of installation. If any part or product is found to be defective as a result of a manufacturer's problem, manufacturer will provide a replacement part at no charge FOB manufacturer's factory.

END OF SECTION

SECTION 23 05 01 - GENERAL MECHANICAL REQUIREMENTS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. This Section pertains to all work under Divisions 21, 22, 23 and 25 and applicable provisions of Division 01.
- B. The methods and materials described within this Section are basic to the entire project and shall be considered as minimum requirements for all sections unless specifically stated otherwise.

1.02 SCOPE OF WORK

- A. The work to be done under this specification includes the furnishing of all labor, materials, equipment and services necessary for the proper completion of all mechanical work. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts. All material and equipment shall be new and undamaged.

1.03 CODES, REGULATIONS & STANDARDS

- A. All work under this Division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations and applicable standards of technical societies where referenced hereinafter. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

Americans with Disabilities Act
American National Standard Institute (ANSI)
National Electric Code (NEC)
National Fire Protection Association (NFPA)
Local Utilities Regulations
Local Codes, Rules and Regulations
Standards of the American Society of Testing Materials (ASTM)
American Gas Association (AGA)
Occupational Safety and Health Act (OSHA)
International Building Code
State Plumbing Code
International Mechanical Code, Minnesota Amendments
International Fuel Gas Code
Wisconsin Enrolled Business Code
State Energy Code
Underwriters' Laboratories

1.04 INSPECTION OF SITE

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to work required in order to comply with these plans and specifications, or his lack of knowledge of conditions in connection with the work. Information received by the Contractor from telephone conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

1.05 RECORD DOCUMENTS

- A. Refer to the Division 01 70 00 Section: PROJECT CLOSEOUT for requirements. The following

paragraphs supplement the requirements of Division 01.

- B. Mark drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes, and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned for column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.
- C. Mark specifications to indicate approved substitutions; Change Orders; actual equipment and materials used.

1.06 WORKMANSHIP

- A. All work shall be installed and completed by workmen skilled in their trade and shall be installed in a practical and efficient workmanlike manner and in strict accordance with the best practice of the trade.

1.07 MECHANICAL SUBMITTALS

- A. Refer to the Instructions To Bidders, Conditions of the Contract (General and Supplementary) and Division 01 33 00 Section: SUBMITTALS for submittal definitions, requirements and procedures.
- B. Refer to Division 21, 22, 23 and 25 sections for submittal requirements.
- C. The approval of the submittals is general and does not relieve the Contractor from the responsibility for adherence to the specifications, nor shall it relieve him of the responsibility for any error which may exist. Dimensions and quantities are the responsibility of the Contractor.

1.08 MANUFACTURER'S DIRECTIONS

- A. Materials and equipment shall be installed in accordance with the manufacturer's directions unless specifically designated herein.

1.09 ACCESSIBILITY

- A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.
- B. Extend all grease fittings to an accessible location.

1.10 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to equipment specifications for rough-in requirements.

1.11 MECHANICAL INSTALLATIONS

- A. Coordinate mechanical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots and openings in other building components to allow for mechanical installations.

- D. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed.
- E. Sequence, coordinate and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.
- G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible.
- H. Install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- I. Coordinate the installation of mechanical materials and equipment above ceilings with suspension system, light fixtures and other installations.
- J. Coordinate connection of mechanical systems with exterior underground services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

1.12 NAMEPLATE DATA

- A. Provide permanent operational data nameplate on each item of power-operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in an accessible location.

1.13 OPERATION & MAINTENANCE DATA

- A. Refer to the Division 01 33 00 Section: SUBMITTALS for procedures and requirements for preparation and submittal of maintenance manuals.
- B. In addition to the information required by Division 01 for maintenance data, include the following information:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests and complete nomenclature and commercial numbers of all replaceable parts.
 - 2. Manufacturer's printed operating procedures to include startup, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown and emergency instructions; and summer and winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.

1.14 WARRANTIES

- A. Refer to the Division 01 33 00 Section: SUBMITTALS for procedures and submittal requirements for

warranties. Refer to individual equipment specifications for warranty requirements.

- B. Compile and assemble the warranties specified in Divisions 21, 22, 23 and 25, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.
- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses and telephone numbers and procedures for filing a claim and obtaining warranty services.

1.15 CLEANING

- A. Refer to the Division 01 11 00 Section: SUMMARY OF THE WORK for general requirements for final cleaning.
- B. Refer to Division 23 05 93 Section: TESTING, ADJUSTING AND BALANCING for requirements for cleaning filters, strainers and mechanical systems prior to final acceptance.

1.16 PROJECT CLOSEOUT

- A. Refer to the Division 01 70 00 Section: PROJECT CLOSEOUT for procedures and requirements for project closeout.

1.17 EXISTING CONDITIONS & SERVICES

- A. When encountered in work, protect, brace, support existing active services included but not restricted to sewers, gas, electric and other systems where required for proper execution of work. If existing active services are encountered that require relocation, make request in writing for determination. Do not proceed with work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in work, remove, cap or plug inactive services. Notify utility companies or municipal agencies having jurisdiction; protect or remove these services as directed.
- C. Where work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Engineer, which will cause least interference with established operating routine. Arrange to work continuously, including overtime, if required, to make necessary connections to existing work.

1.18 PERMITS, LICENSES & FEES

- A. The Contractor shall obtain and pay for all construction permits, notices, inspection fees, licenses, etc., necessary for the performance to the work included in this contract; and he shall observe any requirements stipulated thereon.

1.19 FIRE & SAFETY PRECAUTIONS

- A. Take all necessary precautions for safety of employees and public. Comply with applicable provisions of Federal, State and Local laws, ordinances and requirements. Erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and post danger signs warning against hazards of construction. All employees shall be notified of potentially hazardous materials according to "Right to Know" statutes.

1.20 REFERENCES

AFI	Air Filter Institute
AGA	American Gas Association
AIEE	American Institute of Electrical Engineers

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 Materials
AWWA	American Water Works Association
CMA	Convactor Manufacturers Association
CSD	Commodity Standards Division, US Dept. of Commerce
HPACCNA	Heating, Piping and Air Conditioning Contractors National Association
IBR	Institute of Boiler and Radiator Manufacturers
IUHA	Industrial Unit Heater Association
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAFM	National Association of Fan Underwriters
NBFU	National Board of Fire Underwriters
NEC	National Electric Code (NFPA Pamphlet #70)
NEMA	National Electric Manufacturers Association
SBI	Steel Boiler Institute
SMACNA	Sheetmetal and Air Conditioning Contractors National Association
UL	Underwriters' Laboratories, Inc.

1.21 ABBREVIATIONS

a-c	alternating current	ID	inside diameter
AFF	above finish floor	in or "	inch
AFG	above finish grade	ips	intermediate-pressure
amp	ampere	ips	iron pipe size
atm	atmospheric	kw	kilowatt
boiler hp	boiler horsepower	kw/hr	kilowatt/hour
bhp	brake horsepower	lb	pound
BTU	British thermal unit	lin ft / LF	linear foot
BTUH	BTU per hour	max	maximum
C	degree Centigrade	M&E	Mechanical and Electrical
cfm	cubic feet per minute	M&ER	M&E Requirements
c.i.	cast iron	MBH	thousand BTU/hour
c-p	chrome-plated	MCF	1000 cubic feet
cu in	cubic inch	min	minimum
cu ft/CF	cubic foot	m-p	medium-pressure
cu yd	cubic yard	o.a.	outside air
db	decibel	o.c.	center to center or on center
d-c	direct current	od / OD	outside diameter
deg	degree	os&y	outside screw & yoke
dia	diameter	oz	ounce
dif	diffuser	provide	to furnish and install
edr/EDR	equivalent direction radiation	prv	pressure reducing valve
exh	exhaust	psi	pounds/square inch
F	degree Fahrenheit	PVC	Polyvinyl Chloride
FD	Fire Department	R.A.	return air
FD	floor drain	RAG	return air grille
fpm	feet per minute	reg	register
F & T	float & thermostatic	rpm	revolutions/minute
ft or '	foot	sec	second
gal	gallon	sq ft	square foot
gph	gallons per hour	sq in	square inch
gpm	gallons per minute	sp	static pressure
Hg	Mercury	swp	steam working pressure
h-p	high-pressure	std	standard
hp	horsepower		

hr	hour	tdh	total dynamic head
Hs	sensible heat gain	temp	temperature
		wwp	water working pressure

1.22 STREET, SIDEWALK, CURB & LAWN REPAIR

- A. Each Contractor will be responsible for the replacement of existing street pavement, curbs, sidewalks, lawn, etc., removed by him or damaged by him in the course of the work. Pavement repairs shall be done as required by the Owner, state or city; and the Contractors shall make the necessary arrangements to perform such repairs and shall pay all costs in connection with same unless work is to be reconstructed under the General Contract.

1.23 EXCAVATION, TRENCHING & BACKFILL

- A. Each Contractor shall perform his own excavating necessary and required, in compliance with the standards of Division 31 and the additional applicable requirements listed below:
- B. Soil Data. When subsurface investigations have been made and the results shown on the drawings or included in the specification, the information was obtained primarily for use in preparing foundation design, but the Contractor may draw his own conclusions therefrom. No responsibility is assumed by Architect/Engineer for subsoil quality or conditions other than at the locations at the time the exploration was made. No claim for extra compensation or for extension of time will be allowed on account of subsurface conditions inconsistent with the data shown, except as provided elsewhere herein.
- C. Separate Trenches. Unless otherwise shown or required, provide separate trenches for sewers, water lines and gas lines, respectively, with a minimum of 3 ft. of undisturbed earth between trenches.
- D. Trench Width. Excavate trenches of sufficient width for proper installation of the work. When the depth of backfill over the sewer pipe exceeds 10 ft., keep the trench at the level of the top of the pipe as narrow as practicable.
- E. Grading Trench Bottom. Perform final grading of trench bottoms by hand tools; carry machine excavation only to such depth that soil bearing for pipes will not be disturbed. Grade the bottom of trenches evenly to insure uniform bearing for all pipes. Remove all stones and unsound materials. Cut holes as necessary for joints and joint making. In event bottoms are carried below grade, backfill with sand at no expense to Owner.
- F. Tree Protection. Exercise care to protect the roots of trees to remain. Within the branch spread of such trees, perform all trenching by hand. Open the trench only when the utility can be installed immediately, prune injured roots cleanly, and backfill as soon as possible.
- G. Backfilling. Only after work has been inspected, tested and locations of pipe lines and appurtenances have been recorded. For a depth of at least 12" above the top of the pipe, backfill with earth or granular material free from stones and rock fragments larger than 2" and roots and sod; exclude cinders, junk, refuse, scrap iron and unused portions of welding rods from trenches in which metal pipes are to be laid; tamp this backfill thoroughly in layers not exceeding 4" in thickness, taking care not to disturb the pipe or injure the pipe coating.

For remaining trench depth, backfill with material as specified in the preceding paragraph except that the material may contain stones, rock, concrete or masonry materials (but no cinders) with a maximum dimension of 4", providing the voids in such coarse material are completely filled with earth or granular material. In the event that sufficient suitable material, as herein specified, is not available from trenching or other excavation, the Contractor shall supply and place the additional material without increase in the Contract Price. Compact thoroughly the backfill herein referred to with a heavy rammer or an approved mechanical compacter of layers not more than 6" thick measured loose. Compact to at least 95% density.

- H. Remove all excess or undesirable material from the site.
- I. Sheeting and Bracing. As necessary to protect workmen and adjacent structures. Comply with OSHA regulations. Do not remove sheeting until backfill is sufficient enough to protect pipe and/or prevent injurious caving. When ordered in writing by the Architect/Engineer, leave the sheeting in place and the Contract Price will be adjusted; cut off such sheeting not to be removed at least 3 ft. below grade.
- J. Water Removal. Keep work free from water while construction therein in progress. Under no circumstances lay pipe or appurtenances in water. Pump or bail water from bell holes to permit proper jointing of pipes. Conduit the discharge from trench de-watering to drains or natural drainage channels.

1.24 ROOF CURBS & FLASHINGS

- A. The General Contractor will provide roof curbs except where noted otherwise and do all flashing for pipes, ducts, ventilators at the time the roofing material is installed. Seal flashing by this Contractor.

1.25 FLOOR, WALL & CEILING ESCUTCHEON PLATES

- A. Where uncovered exposed pipes pass through walls, floors or ceilings, they shall be fitted with wall, floor or ceiling plates. Wherever projecting sleeves occur, the plates shall have a raised hood design to cover the sleeve. Plates shall be set tight against wall or floor.

1.26 WELDING

- A. When required, all welding shall be done by certified welders and licensed fitters who are trained in electric-arc and/or gas welding and experienced in the welding positions and materials required. On all arc-welded joints, a minimum of two passes must be made.

1.27 PROTECTIVE GUARDS

- A. Provide guards to enclose belts, pulleys, sheaves, gears and couplings of galvanized expanded or perforated sheet steel with angle frame and angle or channel mounting supports. Make guard easily removable for access.

1.28 CUTTING & PATCHING

- A. Each Contractor shall perform all cutting necessary to perform his work and shall patch damaged work. However, special permission shall be obtained from the Architect before cutting structural members or finished materials. All patching shall be performed in such manner as to leave no visible trace and to return the part affected to the condition of undisturbed work. Patch with similar material as existing. Paint to match. Exterior surfaces to be watertight.
- B. Provide dust barriers as needed to prevent the spreading of dust to adjoining areas.

1.29 DEMOLITION

- A. When removing existing equipment as shown and as noted, including but not limited to fin-tube radiation, plumbing fixtures, ductwork, temperature controls, electrical wiring and any other demolition work; all piping, wiring, ductwork and any other connections shall be capped off below floors, under floors, inside walls or above ceilings. The floors, walls and/or ceilings shall be patched to match the existing conditions and finishes by the Mechanical Contractor.

1.30 PAINTING

- A. Unless otherwise specified, all finished painting will be done by the General Contractor. This

Contractor shall provide preservation and prime coats. This Contractor shall paint all hangers, straps, braces, supports and equipment requiring same installed by him immediately after installation.

1.31 ACCESS DOORS

- A. Contractor shall coordinate locations and sizes. All access doors shall be by the General Contractor.

1.32 EQUIPMENT PADS

- A. Equipment pads shall be by the General Contractor unless otherwise noted. This Contractor shall coordinate all related information.

1.33 CORE DRILLING WALLS/FLOORS

- A. Contractor shall provide all holes through walls, floors and ceilings necessary for the installation of new piping. All holes shall be core drilled and of sufficient size to allow the pipe to pass through the opening.
- B. All exposed pipes passing through these openings shall be covered with escutcheon plates on both sides unless the openings are sized for a snug fit around the pipe or the openings are reduced by using grout or other cement type closing materials approved by the Engineer. The grout shall be troweled smooth on both sides of the wall and primed for painting.

1.34 CLEANING

- A. Upon completion of work, all rubbish must be cleared away; all fixtures, piping, hangers and trim shall be thoroughly cleaned and ready for use. All ventilating, air conditioning and terminal heating equipment enclosures shall be cleaned with a vacuum cleaner.

END OF SECTION

SECTION 23 05 13 - MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. This Section includes the electrical requirements for all motors, starters and disconnects furnished with mechanical HVAC equipment. See the Equipment Schedule and other sections of these specifications for specific sizes and electrical characteristics.

1.02 QUALITY ASSURANCE

- A. Coordination with Electrical Work: Wherever possible, match elements of electrical provisions of mechanical work with similar elements of electrical work specified in Division 16 sections. Comply with applicable requirements of Division 16 sections for electrical work of this Section which is not otherwise specified.
- B. Standards: For electrical equipment and products, comply with applicable NEMA standards and refer to NEMA standards for definitions of terminology herein. Comply with National Electrical Code (NFPA 70) for workmanship and installation requirements.

PART 2 - PRODUCTS**2.01 MOTORS**

- A. Motor Characteristics: Except where more stringent requirements are indicated and except where required item of mechanical equipment cannot be obtained with fully complying motor, comply with the following requirements for motors of mechanical work:
- B. Temperature Rating: Rated for 40°C environment with maximum 50°C temperature rise for continuous duty at full load (Class A Insulation).
- C. Starting Capability: Provide each motor capable of making starts as frequently as indicated by automatic control system, and not less than five starts per hour for manually controlled motors.
- D. Phases and Current Characteristics: Coordinate current characteristics with power specified in Division 26 sections, and with individual equipment requirements specified in other Division 23 requirements. Do not purchase motors until power characteristics available at locations of motors have been confirmed, and until rotation directions have been confirmed.
- E. Service Factor: 1.15 for polyphase motors and 1.35 for single phase motors.
- F. Motor Construction: Provide general purpose, continuous duty motors, Design "B" except "C" where required for high starting torque.
1. Frames: NEMA #56.
 2. Bearings: Ball or roller bearings with inner and outer shaft seals, regreasable except permanently sealed where motor is normally inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, provide bearings designed to resist thrust loading. Refer to individual sections of Division 15 for fractional-hp light-duty motors where sleeve-type bearings are permitted.
 3. Enclosure Type: Except as otherwise indicated, provide open dripproof motors for indoor use where satisfactorily housed or remotely located during operation, and provide guarded dripproof motors where exposed to contact by employees or building occupants. Provide weather-protected Type I for

outdoor use, Type II where not housed. Refer to individual sections of Division 15 for other enclosure requirements.

4. Overload Protection: Provide built-in thermal overload protection and, where indicated, provide internal sensing device suitable for signaling and stopping motor at starter.
 5. Noise Rating: Provide "Quiet" rating on motors.
 6. Efficiency: Where motors are indicated to be "Energy Efficient," provide motors having NEMA premium efficiency as scheduled in accordance with IEEE Standard 112, test method B.
 7. Power Factor - Equal to .95
- G. Nameplate: Provide metal nameplate on each motor, indicating full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

2.02 STARTERS, ELECTRICAL DEVICES & WIRING

- A. See the Equipment Schedule for requirements.
- B. All electrical items shall be UL listed.

2.03 EQUIPMENT FABRICATION

- A. Fabricate mechanical equipment for secure mounting of motors and other electrical items included in work. Provide either permanent alignment of motors with equipment, or adjustable mounting as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Provide safe, secure, durable and removable guards for motor drives, arranged for lubrication and similar running-maintenance without removal of guards.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install motors on motor mounting systems in accordance with motor manufacturer's instructions, securely anchored to resist torque, drive thrusts, and other external forces inherent in mechanical work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws, except motors of 1/3 hp and less may be secured with Allen set screws on flat surface on shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.
- B. All electrical work subcontracted or performed by this Contractor shall comply with Division 26 requirements.

END OF SECTION

SECTION 23 05 29 - HANGERS & SUPPORTS FOR HVAC PIPING & EQUIPMENT**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 21 13 - Hydronic Piping
- C. 23 22 13 - Steam & Condensate Piping
- D. 23 31 13 - Metal Ductwork
- E. 23 34 00 - HVAC Fans

1.02 SCOPE OF WORK

- A. Install hangers and supports required by this Section as indicated on drawings and/or specified in this section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of supports and anchors, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.04 SUBMITTALS

- A. Shop Drawings: Submit shop drawings, including installation instructions for each type of support and anchor.
- B. Maintenance Data: Submit maintenance data and parts lists for each type of support and anchor. Include this data, product data and shop drawings in maintenance manual.

PART 2 - PRODUCTS**2.01 APPROVED MANUFACTURERS**

- A. Expansion Anchors - Hilti
- B. Hangers - B-Line, Anvil, Carpenter and Patterson
- C. Pipe Riser Clamps - Grinnell, Anvil
- D. Powder Drive Fasteners - Hilti
- E. Seals - Thunderline
- F. Saddles and Shields - Anvil, Pipe Shields

2.02 EXPANSION ANCHORS

- A. Anchors shall be stud or shell type. Stud type shall meet ASTM A108, ASTM B633 and FF-S-325. Shell type shall meet ASTM B633.

2.03 HORIZONTAL-PIPING HANGERS & SUPPORTS

- A. Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with MSS SP-58, selected by Installer to suit horizontal-piping systems, in accordance with

MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

2.04 VERTICAL-PIPING CLAMPS

- A. Except as otherwise indicated, provide factory-fabricated vertical-piping clamps complying with MSS SP-58, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

2.05 HANGER-ROD ATTACHMENTS

- A. Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

2.06 BUILDING ATTACHMENTS

- A. Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

2.07 SADDLES & SHIELDS

- A. Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.
 - 1. Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation.
 - 2. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.
 - 3. Thermal Hanger Shields: Constructed of 360° insert of high density, 100 psi, waterproofed calcium silicate, encased in 360° sheetmetal shield. Provide assembly of same thickness as adjoining insulation.

2.08 SPRING HANGERS & SUPPORTS

- A. Except as otherwise indicated, provide factory-fabricated spring hangers and supports complying with MSS SP-58, selected by Installer to suit piping system, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select spring hangers and supports to suit pipe size and loading.

2.09 MISCELLANEOUS MATERIALS

- A. Provide products complying with NEMA Std ML 1.
- B. Powder Driven Fasteners - Fasteners shall be plated in accordance with QQ-2-325-C.
- C. Seals - Where pipes pass through sleeves in walls below grade, provide a modular wall sleeve.

- D. Sleeves - Pipe sleeves shall be standard weight black steel.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which supports and anchors are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 PREPARATION

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.

3.03 INSTALLATION OF BUILDING ATTACHMENTS

- A. Install building attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional concentrated loads, including valves, flanges, guides, strainers, expansion joints and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.

3.04 INSTALLATION OF HANGERS & SUPPORTS

- A. Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69 and SP-89. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
- C. Support fire-water piping independently of other piping.
- D. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, or by other recognized industry methods.
- E. Install powder-actuated drive-pin fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual. Do not use in lightweight concrete slabs or in concrete slabs less than 4" (100mm) thick.
- F. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4" (100mm) thick.
- G. Provisions for Movement:
1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion

- loops, expansion bends and similar units.
- 2. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- 3. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 Pressure Piping Codes are not exceeded.

H. Insulated Piping: Comply with the following installation requirements:

- 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
- 2. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields. For pipe 8" and over, install wood insulation saddles.
- 3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

I. Horizontal Pipe Supports, Spacing and Loading, Saddle Length:

Pipe Size	Max. Span / Feet		Min. Rod Diameter	
	copper	steel*	copper	steel
Up to 3/4"	6	6	3/8	3/8
1"	6	8	3/8	3/8
1-1/4" to 2"	8	10	3/8	3/8
2-1/2" to 3"	9	10	1/2	1/2
4" to 5"		12		5/8
6"		12		3/4
8" to 12"		12		7/8

*Denotes maximum span unless 10-foot lengths of pipe are used then 10-foot span allowed.
Cut bolts, grind sharp edges and corners.

J. Plastic pipe supported every 32".

3.05 EQUIPMENT SUPPORTS

- A. Concrete housekeeping bases will be provided by General Contractor. Furnish to Contractor scaled layouts of all required bases, with dimensions of bases and location to column center lines. Furnish templates, anchor bolts and accessories necessary for base construction.
- B. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands.

3.06 ADJUSTING & CLEANING

- A. Hanger Adjustments: Adjust hangers so as to distribute loads equally on attachments.
- B. Support Adjustment: Provide grout under supports so as to bring piping and equipment to proper level and elevations.

- C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING & EQUIPMENT**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 23 - Valves for HVAC Piping
- C. 23 11 13 - Fuel Oil Piping
- D. 23 21 13 - Hydronic Piping
- E. 23 22 13 - Steam & Condensate Piping
- F. 23 31 13 - Metal Ductwork

1.02 SCOPE OF WORK

- A. Install identification as required by this Section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.04 SUBMITTALS

- A. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses, by special "flags," in copies for maintenance manuals.
- B. Maintenance Data: Include product data and schedules in maintenance manuals.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. Paint - Benjamin Moore, Devoe, Pratt & Lambert, Rust-O-Leum
- B. Pipe Labels - Seton, Brady

2.02 PAINTED IDENTIFICATION MATERIALS

- A. This Contractor shall be responsible for preparing and painting items described in this section.

2.03 PIPE IDENTIFICATION

- A. Snap-On Type: Provide manufacturer's standard preprinted, semi-rigid, snap-on, color-coded pipe markers, complying with ANSI A13.1.
- B. Pressure-Sensitive Type: Provide manufacturer's standard preprinted, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, complying the ANSI A13.1.

2.04 DUCT IDENTIFICATION

- A. Provide manufacturer's standard laminated plastic, color-coded duct markers that comply with ASME A13.1.

1. Green: cold air.
2. Yellow: hot air.
3. Yellow/Green: supply air.
4. Blue: exhaust, outside, return and mixed air.

B. Nomenclature: Include the following:

1. Direction of air flow.
2. Duct service (supply, return, exhaust, etc.).
3. Duct origin (from).
4. Duct destination (to).
5. Design cfm.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.02 DUCTWORK IDENTIFICATION

- A. Identify air supply, return, exhaust, intake and relief ductwork with duct markers; or provide stenciled signs and arrows, showing ductwork service and direction of flow, in black or white (whichever provides most contrast with ductwork color).
- B. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures (shaft, underground or similar concealment), and at 50' spacings along exposed runs.
- C. Access Doors: Provide duct markers or stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety and procedural information.
- D. Concealed Doors: Where access doors are concealed above acoustical ceilings or similar concealment, plasticized tags may be installed for identification in lieu of specified signs, at Installer's option.

3.03 PIPING SYSTEM IDENTIFICATION

- A. Install pipe markers of one of the following types on each system indicated to receive identification and include arrows to show normal direction of flow.
1. Stenciled markers, including color-coded background band or rectangle, and contrasting lettering of black or white. Extend color band or rectangle 2" beyond ends of lettering.
 2. Stenciled markers, with lettering color complying with ANSI A13.1.
 3. Plastic pipe markers, with application system as indicated under "Materials" in this Section. Install on pipe insulation segment where required for hot non-insulated pipes.
 4. Stenciled markers, black or white for best contrast, wherever continuous color-coded painting of piping is provided.

- B. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
1. Near each valve and control device.
 2. Near each branch, excluding short takeoffs for fixtures and terminal units; mark each pipe at branch where there could be question of flow pattern.
 3. Near locations where pipes pass through walls or floors/ceilings or enter non-accessible enclosures.
 4. At access doors, manholes and similar access points which permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 20' in congested areas of piping and equipment.
 7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

C. Pipe Identification:

Function

Natural Gas

Stencil Working

NATURAL GAS
(WITH DIRECTIONAL ARROW)

3.04 MECHANICAL EQUIPMENT IDENTIFICATION

- A. Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
 2. Fuel-burning units including boilers, furnaces, heaters, stills, absorption units and make-up air units.

3.05 ADJUSTING & CLEANING

- A. Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this Division or other divisions.
- B. Cleaning: Clean face of identification devices and glass frames of valve charts.

3.06 EXTRA STOCK

- A. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
1. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

END OF SECTION

SECTION 23 05 93 - TESTING, ADJUSTING & BALANCING FOR HVAC**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. Extent of testing, adjusting and balancing work required by this Section is indicated on drawings and schedules, and by requirements of this Section, and is defined to include, and is limited to air terminals and air outlets, inlets, reliefs and returns, and hydronic systems. The work consists of conducting tests, preparing and submitting reports, and recommending modifications to work as required by contract documents.
- B. Component types of testing, adjusting and balancing specified in this Section includes the following as applied to mechanical equipment:
 - 1. Fans.
 - 2. Ductwork systems.
 - 3. Terminal units.
 - 4. Air handling units.

1.02 QUALITY ASSURANCE

- A. Tester's Qualifications: A firm certified by TABB or NEBB in those testing and balancing disciplines similar to those required for this project, who is not Installer of system to be tested and is otherwise independent of project.
- B. NEBB Compliance: Comply with the "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems" as applicable to mechanical air and hydronic distribution systems and associated equipment and apparatus as specified by the Certified Balancing Bureau.
- C. Industry Standards: Comply with ASHRAE recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

1.03 SUBMITTALS

- A. Submit certified test reports, signed by Test and Balance Supervisor who perform TAB work.
 - 1. Include identification and types of instruments used, and their most recent calibration date with submission of final test report.
- B. Maintenance Data: Include in maintenance manuals copies of certified test reports.

1.04 JOB CONDITIONS

- A. Do not proceed with testing, adjusting and balancing work until work has been completed and is operable. Ensure that there is no latent residual work still to be completed on the tested equipment.
- B. Do not proceed until work scheduled for testing, adjusting and balancing is clean and free from debris, dirt and discarded building materials.

PART 2 - PRODUCTS**2.01 PATCHING MATERIALS**

- A. Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housing which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.

1. At Tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housing.

2.02 TEST INSTRUMENTS

- A. Utilize test instruments and equipment for TAB work required, of type, precision and capacity as recommended in the following TAB standards:
 1. Balancing Bureau's Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
- B. The Contractor shall employ manufactured enclosure type cones, capable of air volume direct readings, for all diffuser air flow measurements.

PART 3 - EXECUTION

3.01 FIELD WORK

- A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.
- B. Test, adjust and balance environmental systems and components, as indicated, in accordance with procedures outlined in applicable standards.
- C. Test, adjust and balance system during summer season for air conditioning systems and during winter season for heating systems, including at least period of operation at outside condition within 5°F (3°C) wet bulb temperature of maximum summer design condition, and within 10°F (6°C) dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit.
- D. Patch holes in insulation, ductwork and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.

3.02 REPORTS

- A. Prepare report of test results, including instrumentation calibration reports, in format recommended by applicable standards.
- B. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced; including, where necessary, modifications which exceed requirements of contract documents for mechanical work.

3.03 FINAL TESTS, INSPECTION & ACCEPTANCE

- A. Retests: If random tests elicit a measured flow deviation of 10% or more from that recorded in Certified Report listings, at 10% or more of the rechecked selections, report shall be automatically rejected. In the event report is rejected, systems shall be readjusted and tested, new data recorded, new Certified Reports submitted, and new inspection tests made, at no additional cost to the Engineer. Retainage time referred to in paragraph 3.5 of this Section shall be based on date of final acceptance of Certified Report.
- B. Marking of Settings: Following final acceptance of Certified Reports by the Engineer, settings of valves, splitters, dampers and other adjustment devices shall be permanently marked by the Contractor so that adjustment can be restored if disturbed at any time. Devices shall not be marked until after final acceptance.

END OF SECTION

SECTION 23 07 13 - DUCT INSULATION**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 31 13 - Metal Ductwork

1.02 SCOPE OF WORK

- A. Install insulation required by this Section is indicated on drawings and schedules and by requirements of this Section.
- B. Types of mechanical insulation specified in this Section include the following:
 - 1. Ductwork System Insulation:
 - a. Fiberglass.

1.03 QUALITY ASSURANCE

- A. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method. In addition, the products, when tested, shall not drip flame particles; and flame shall not be progressive.

1.04 SUBMITTALS

- A. Shop Drawings: Submit shop drawings and installation instructions for each type of mechanical insulation. Submit schedule showing manufacturer's product number, k-value, thickness and furnished accessories for each mechanical system requiring insulation. Also furnish necessary test data certified by an independent testing laboratory.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of mechanical insulation. Include this data and product data in maintenance manual.

1.05 DELIVERY, STORAGE & HANDLING

- A. Deliver insulation, coverings, cements, adhesives and coatings to site in containers with manufacturer's stamp or label, affixed showing fire hazard indexes of products.
- B. Protect insulation against dirt, water and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

PART 2 - PRODUCTS**2.01 ACCEPTABLE MANUFACTURERS**

- A. Armstrong; CertainTeed; Knauf; Johns-Manville; Owens-Corning Fiberglass Corp.; Pittsburgh Corning Corp.

2.02 DUCTWORK INSULATION MATERIALS

- A. Rigid Fiberglass Ductwork Insulation: Class 1, Standard 2# Density with aluminum jacket/facing.
- B. Ductwork Insulation Accessories: Provide staples, bands, wires, tape, anchors, corner angles and similar

accessories as recommended by insulation manufacturer for applications indicated.

- C. Ductwork Insulation Compounds: Provide cements, adhesives, coatings, sealers, protective finishes and similar compounds as recommended by insulation manufacturer for applications indicated.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which mechanical insulation is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 DUCTWORK SYSTEM INSULATION

- A. Insulation Omitted: Unless otherwise noted, do not apply insulation to the following systems, materials and equipment:

1. Lined ductwork.

- B. Outdoor Air and Mixed Air Ductwork:

1. Application Requirements: Insulate the following ductwork:

- a. Outdoor air intake ductwork between air entrance and fan inlet or HVAC unit inlet (Equipment #1 and #2).
- b. All solar wall ductwork to be insulated.
- c. Furnace(s) outdoor air intake from outside louver to wall between Parking Bay 100 and Furnace Room 102.

2. Insulate each ductwork system specified above with one of the following types and thicknesses of insulation:

- a. Rigid Fiberglass: Thickness to achieve a minimum R5. Provide vapor retarder in accordance with IMC Section 604.11.
- b. Flexible Fiberglass: Thickness to achieve a minimum R5, limited to concealed space.

- C. Supply Air, Return Air and Exhaust/Relief Air Ductwork:

1. Application Requirements: Insulate the following ductwork:

- a. Supply ductwork between fan discharge or HVAC unit discharge and discharge air diffuser (excluding Furnace, Equipment #10).
- b. Exhaust and relief ducts (from exterior surface back to 6 feet, including drip pan).

2. Insulate each ductwork system specified above with one of the following types and thicknesses of insulation:

- a. Rigid Fiberglass: Thickness to achieve a minimum R5.
- b. Flexible Fiberglass: Thickness to achieve a minimum R5, application limited to concealed locations.
- c. Provide vapor retarder required in accordance with IMC 604.11.

3.03 INSTALLATION OF DUCTWORK INSULATION

- A. Install insulation products in accordance with manufacturer's written instructions and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.

- B. Install insulation materials with smooth and even surfaces.
- C. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
- D. Maintain integrity of vapor barrier on ductwork insulation and protect it to prevent puncture and other damage.
- E. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations except where otherwise indicated.
- F. Ductwork Exposed to Weather: Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.
- G. Corner Angles. Except for oven and hood exhaust duct insulation, install corner angles on external corners of insulation on ductwork in exposed finished spaces before covering with jacketing.

3.04 EXISTING INSULATION REPAIR

- A. Repair damaged sections of existing mechanical insulation, both previously damaged or damaged during this construction period. Use insulation of same thickness as existing insulation, install new jacket lapping and sealed over existing.

3.05 PROTECTION & REPLACEMENT

- A. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

END OF SECTION

SECTION 23 09 11 GAS DETECTION SYSTEMS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 09 13 - Electric Control Systems
- C. 23 09 93 - Sequence of Controls

1.02 SCOPE OF WORK

- A. Install gas monitoring systems as required by this Section is indicated on drawings and schedules and by requirements of this Section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of gas monitoring equipment, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firms specializing and experienced in electric control system installations for not less than 5 years.
- C. Codes and Standards:
 - 1. Electrical Standards: Provide electrical products which have been tested, listed and labeled by UL and comply with NEMA standards.
 - 2. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for electric control systems.
 - 3. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each control device furnished, indicating dimensions, capacities, performance characteristics, electrical characteristics, finishes of materials, and including installation and startup instructions.
- B. Shop Drawings: Submit shop drawings for each gas monitoring system, containing the following information:
 - 1. Schematic flow diagram of system showing sensors, wiring and panels.
 - 2. Indicate all required electrical wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- C. Maintenance Data: Submit maintenance instructions and spare parts lists. Include this data, product data and shop drawings in maintenance manuals; in accordance with requirements of Division 01.

1.05 DELIVERY, STORAGE & HANDLING

- A. Provide factory shipping cartons for each piece of equipment and control device. Maintain cartons while shipping, storage and handling as required to prevent equipment damage, and to eliminate dirt and

moisture from equipment. Store equipment and materials inside and protect from weather.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Armstrong Monitoring, Brasch, Honeywell, Tox-Alert

2.02 CONTROL PANEL

- A. Provide a controller to monitor the sensors and start the exhaust fan. When a sensor indicates a gas concentration of 305 LEL or higher, the associated exhaust fan shall start and the LED shall indicate "Warning level" (exhaust fan on) operation. If the gas concentration reaches 50% LEL or higher, an alarm set of contacts shall close which shall indicate alarm condition and light an alarm LED.
- B. The controller shall have internal LEDs (light emitting diodes) to indicate "Warning level" and "Alarm level" for each sensor input.
- C. Options:
 - 1. Provide a clearly labeled red alarm light or LED on the face of the panel to indicate system alarm. Provide an audible alarm with a minimum of 68db sound level on the face of the controller panel. Also provide a momentary pushbutton to silence the audible alarm. The alarm light or LED shall remain lighted as long as the alarm condition persists even though the audible signal has been silenced.
 - 2. Provide a labeled LED on the front of the controller panel for each of the sensor inputs. When a sensor reaches the "Warning level," its associated LED shall light and remain lighted as long as the sensors signal remains above the warning level. When a sensor reaches the "Alarm level," its associates LED shall light and remain lighted as long as the sensor signal remains above the alarm level. Mount unit at manufacturer's recommendation.
 - 3. Provide a digital display on the front of the controller panel for each sensor input. The display shall display the PPM value or LEL value.
 - 4. Provide an LED on the face of the panel to indicate sensor signal failure. This failure shall also sound the audible alarm.
- D. Provide the following sensors:
 - 1. CO Sensor:
 - a. Install carbon monoxide (CO) sensors where indicated on the drawings and as specified herein. The CO sensors shall have a linear analog output signal proportional to the CO gas levels detected, and shall have normal operation over the environmental range of -20°F to 122°F and 0 to 95% RH non-condensing. The sensors shall have a maximum range of 0 to 400 PPM (parts per million) and an accuracy of ± 3% of range. The CO sensors shall be microprocessor based and shall periodically recalibrate itself. The sensor cabinet shall be a NEMA 1 and be key locked to prevent tampering. The sensor shall have indicating lamp(s) to indicate; POWER ON, sensor operating normally, and sensor failure. The CO sensor shall be designed to indicate "sensor failure" to its controller(s) when the sensor is malfunctioning. The sensor output signal resolution shall be minimum of 12 bits so that controllers can sense .1 PPM signal change.
 - b. The CO sensor(s) shall be powered by low voltage so they can be wired using class 2 wiring. The CO sensors shall be designed to work with DDC controllers, PLCs (programmable logic

controllers), automation system.

2. Nitrogen Dioxide (NO₂) Sensor: Install nitrogen dioxide sensor where indicated on the drawings and as specified. The NO₂ sensors shall be similar to CO sensor in operating temperature of -20°F to 122°F.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which electric control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF GAS MONITORING SYSTEMS

- A. Install systems and materials in accordance with manufacturer's instructions, roughing-in drawings and details shown on drawings. Install electrical components and use electrical products complying with requirements of applicable Division 23 sections of these specifications. Mount controllers at convenient locations and heights.
- B. Wiring System: Install complete control wiring system for gas monitoring systems. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path. Fasten flexible conductors bridging cabinets and doors neatly along hinge side and protect against abrasion. Tie and support conductors neatly.

3.03 ADJUSTING & CLEANING

- A. Startup: Start up, test, and adjust gas monitoring systems in presence of manufacturer's authorized representative. Demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
- C. Final Adjustment: After completion of installation, adjust sensors and similar equipment provided as work of this Section.

END OF SECTION

SECTION 23 09 13 - ELECTRIC CONTROL SYSTEMS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 13 - Motor Requirements for HVAC Equipment
- C. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- D. 23 09 93 - Sequence of Operations

1.02 SCOPE OF WORK

- A. Install electric control system work as required by this Section is indicated on drawings and schedules and by requirements of this Section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of electric control equipment, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firms specializing and experienced in electric control system installations for not less than 5 years.
- C. Codes and Standards:
 - 1. Electrical Standards: Provide electrical products which have been tested, listed and labeled by UL and comply with NEMA standards.
 - 2. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for electric control systems.
 - 3. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each control device furnished, indicating dimensions, capacities, performance characteristics, electrical characteristics, finishes of materials, and including installation and startup instructions.
- B. Shop Drawings: Refer to Section 23 09 93 - Sequence of Operations for shop drawing information.
- C. Shop Drawings: Submit shop drawings for each electric control system, containing the following information:
 - 1. Schematic flow diagram of system showing fans, pumps, coils, dampers, valves and control devices.
 - 2. Label each control device with setting or adjustable range of control.
 - 3. Indicate all required electrical wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
 - 4. Provide details of faces of control panels, including controls, instructions and labeling.

5. Include verbal description of sequence of operation.
- D. Maintenance Data: Submit maintenance instructions and spare parts lists. Include this data, product data and shop drawings in maintenance manuals; in accordance with requirements of Division 01.

1.05 DELIVERY, STORAGE & HANDLING

- A. Provide factory shipping cartons for each piece of equipment and control device. Maintain cartons while shipping, storage and handling as required to prevent equipment damage, and to eliminate dirt and moisture from equipment. Store equipment and materials inside and protect from weather.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS & INSTALLERS

- A. Manufacturers and installers that offer products which may comply with the requirements of this contract include the following: Johnson Controls, Inc.; Siemens, other approved by Addenda.

2.02 MATERIALS & EQUIPMENT

- A. Provide electric control products in sizes and capacities indicated, consisting of valves, dampers, thermostats, clocks, sensors, controllers and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard control system components as indicated by published product information; designed and constructed as recommended by manufacturer. Provide electric control systems with the following functional and construction features as indicated.
- B. Dampers: Provide automatic control dampers as indicated, with damper frames not less than formed 13-gage galvanized steel. Provide mounting holes for enclosed duct mounting. Provide damper blades not less than formed 16-gage galvanized steel, with maximum blade width of 8". Equip dampers with motors, with proper rating for each application.
 1. Secure blades to 1/2" diameter zinc-plated axles using zinc-plated hardware. Seal off against spring stainless steel blade bearings. Provide blade bearings of nylon and provide thrust bearings at each end of every blade. Construct blade linkage hardware of zinc-plated steel and brass. Submit leakage and flow characteristics plus size schedule for controlled dampers.
 2. Operating Temperature Range: From -20 to 200°F (-29 to 93°C).
 3. For standard applications as indicated, provide parallel or opposed blade design (as selected by the manufacturer's sizing techniques) with optional closed-cell neoprene edging.
 4. For low leakage applications as indicated, provide parallel or opposed blade design (as selected by manufacturer's sizing techniques) with inflatable seal blade edging, or replaceable rubber seals, rated for leakage at less than 10 CFM/sq. ft. of damper area, at differential pressure of 4" w.g. when damper is being held by torque of 50 inch-pounds.
 5. Provide unit ventilator outside air dampers with adjustable minimum settings so that ventilation can be adjusted for each space or room.
- C. Room Thermostats: Provide room thermostats with locking covers and with concealed or readily-accessible adjustment devices and deadband, as indicated.
 - a. Provide thermostats with red-reading glass or spiral bi-metallic thermometers.
 - b. Where indicated, provide heavy-duty "asylum type," clear plastic, or wire tamperproof

guards.

1. Line-Voltage On-Off Thermostats: Provide thermostats of bi-metal actuated open contact, or bellows actuated enclosed snap-switch type, or equivalent solid-state type; UL listed at electrical rating comparable with application. Provide bi-metal thermostats which employ heat anticipation. Equip thermostats which control electric heating loads directly, with Off position on dial wired to break ungrounded conductors.
- E. Electronic Sensors: Provide electronic temperature and relative humidity sensors of supersensitive resistance type, which are vibration and corrosion resistant, and of wall-mounted immersion, duct mounting, averaging or bulb type as required for application.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which electric control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF ELECTRIC CONTROL SYSTEMS

- A. Install systems and materials in accordance with manufacturer's instructions, roughing-in drawings and details shown on drawings. Install electrical components and use electrical products complying with requirements of applicable Division 26 sections of these specifications. Mount controllers at convenient locations and heights.
- B. Control Wiring: The term "control wiring" is defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connecting electric control devices.
- C. Wiring System: Install complete control wiring system for electric control systems. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path. Fasten flexible conductors bridging cabinets and doors neatly along hinge side and protect against abrasion. Tie and support conductors neatly.
- D. Number code or color code conductors, excluding those used for local individual room controls, appropriately for future identification and servicing of control system.
- E. Reset Limit Controls: Install manual-reset limit controls to be independent of power controllers; automatic duct heater resets may, at Contractor's option, be installed in interlock circuit of power controllers.
- F. Unit-Mounted Equipment: Where control devices are indicated to be unit mounted, ship electric relays, electric switches, valves, dampers, and damper motors to unit manufacturer for mounting and wiring at factory.

3.03 ADJUSTING & CLEANING

- A. Startup: Start up, test, and adjust electric control systems in presence of manufacturer's authorized representative. Demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
- C. Final Adjustment: After completion of installation, adjust thermostats, control valves, motors and

similar equipment provided as work of this Section.

1. Final adjustment shall be performed by specially trained personnel in direct employ of manufacturer of primary temperature control system.

3.04 CLOSEOUT PROCEDURES

- A. Owner's Instructions: Provide services of manufacturer's technical representative for one 8-hour day to instruct Owner's personnel in operation and maintenance of electric control systems.
 1. Schedule instruction with Owner, provide at least 7-day notice to Contractor and Engineer of training date.

END OF SECTION

SECTION 23 09 23 – BUILDING MANAGEMENT & CONTROL SYSTEM**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. All work of this Division shall be coordinated and provided by the Building Automation System (BAS) Contractor.
- B. The work of this Division shall be scheduled, coordinated, and interfaced with the associated work of other trades. Reference the Division 15 Sections for details.
- C. The work of this Division shall be as required by the Specifications, Point Schedules and Drawings.
- D. If the BAS Contractor believes there are conflicts or missing information in the project documents, the Contractor shall promptly request clarification and instruction from the design team.

1.02 DEFINITIONS

- A. Analog: A continuously variable system or value not having discrete levels. Typically exists within a defined range of limiting values.
- B. Binary: A two-state system where an “ON” condition is represented by one discrete signal level and an “OFF” condition is represented by a second discrete signal level.
- C. Building Automation System (BAS): The total integrated system of fully operational and functional elements, including equipment, software, programming, and associated materials, to be provided by this Division BAS Contractor and to be interfaced to the associated work of other related trades.
- D. BAS Contractor: The Contractor to provide the work of this Division. This Contractor shall be the primary manufacturer, installer, commissioner and ongoing service provider for the BAS work.
- E. Control Sequence: A BAS pre-programmed arrangement of software algorithms, logical computation, target values and limits as required to attain the defined operational control objectives.
- F. Direct Digital Control: The digital algorithms and pre-defined arrangements included in the BAS software to provide direct closed-loop control for the designated equipment and controlled variables. Inclusive of Proportional, Derivative and Integral control algorithms together with target values, limits, logical functions, arithmetic functions, constant values, timing considerations and the like.
- G. BAS Network: The total digital on-line real-time interconnected configuration of BAS digital processing units, workstations, panels, sub-panels, controllers, devices and associated elements individually known as network nodes. May exist as one or more fully interfaced and integrated sub-networks, LAN, WAN or the like.
- H. Node: A digitally programmable entity existing on the BAS network.
- I. BAS Integration: The complete functional and operational interconnection and interfacing of all BAS work elements and nodes in compliance with all applicable codes, standards and ordinances so as to provide a single coherent BAS as required by this Division.
- J. Provide: The term “Provide” and its derivatives when used in this Division shall mean to furnish, install in place, connect, calibrate, test, commission, warrant, document and supply the associated required services ready for operation.
- K. PC: IBM-compatible Personal Computer from a recognized major manufacturer.

- L. Furnish: The term “Furnish” and its derivatives when used in this Division shall mean supply at the BAS Contractor’s cost to the designated third party trade contractor for installation. BAS Contractor shall connect furnished items to the BAS, calibrate, test, commission, warrant and document.
- M. Wiring: The term “Wiring” and its derivatives when used in this Division shall mean provide the BAS wiring and terminations.
- N. Install: The term “Install” and its derivatives when used in this Division shall mean receive at the jobsite and mount.
- O. Protocol: The term “protocol” and its derivatives when used in this Division shall mean a defined set of rules and standards governing the on-line exchange of data between BAS network nodes.
- P. Software: The term “software” and its derivatives when used in this Division shall mean all of programmed digital processor software, preprogrammed firmware and project specific digital process programming and database entries and definitions as generally understood in the BAS industry for real-time, on-line, integrated BAS configurations.
- Q. The use of words in the singular in these Division documents shall not be considered as limiting when other indications in these documents denote that more than one such item is being referenced.
- R. Headings, paragraph numbers, titles, shading, bolding, underscores, clouds and other symbolic interpretation aids included in the Division documents are for general information only and are to assist in the reading and interpretation of these Documents.
- S. The following abbreviations and acronyms may be used in describing the work of this Division:
- | | | |
|--------|---|---|
| ADC | - | Analog to Digital Converter |
| AI | - | Analog Input |
| AN | - | Application Node |
| ANSI | - | American National Standards Institute |
| AO | - | Analog Output |
| ASCII | - | American Standard Code for Information Interchange |
| ASHRAE | - | American Society of Heating, Refrigeration and Air Conditioning Engineers |
| AWG | - | American Wire Gauge |
| CPU | - | Central Processing Unit |
| CRT | - | Cathode Ray Tube |
| CZC | - | Commercial Zone Control |
| DAC | - | Digital to Analog Converter |
| DC | - | Digital Controller |
| DDC | - | Direct Digital Control |
| DI | - | Digital Input |
| DO | - | Digital Output |
| EEPROM | - | Electrically Erasable Programmable Read Only Memory |
| EMI | - | Electromagnetic Interference |
| FAS | - | Fire Alarm Detection and Annunciation System |
| GUI | - | Graphical User Interface |
| HOA | - | Hand-Off-Auto |
| ID | - | Identification |
| IEEE | - | Institute of Electrical and Electronics Engineers |
| I/O | - | Input/Output |
| LAN | - | Local Area Network |
| LCD | - | Liquid Crystal Display |
| LED | - | Light Emitting Diode |
| MCC | - | Motor Control Center |
| NC | - | Normally Closed |

NIC	-	Not In Contract
NO	-	Normally Open
OWS	-	Operator Workstation
OAT	-	Outdoor Air Temperature
PC	-	Personal Computer
RAM	-	Random Access Memory
RF	-	Radio Frequency
RFI	-	Radio Frequency Interference
RH	-	Relative Humidity
ROM	-	Read Only Memory
RTD	-	Resistance Temperature Device
SPDT	-	Single Pole Double Throw
SPST	-	Single Pole Single Throw
TBA	-	To Be Advised
TCP/IP	-	Transmission Control Protocol/Internet Protocol
TTD	-	Thermistor Temperature Device
UPS	-	Uninterruptible Power Supply
VAC	-	Volts, Alternating Current
VAV	-	Variable Air Volume
VDC	-	Volts, Direct Current
WAN	-	Wide Area Network
XVGA	-	Extended Video Graphics Adapter

1.03 BAS DESCRIPTION

- A. The Building Automation System (BAS) shall be a complete system designed for scalable implementation from small stand-alone use to large, networked systems. This functionality shall extend into the equipment rooms. Devices residing on the enterprise IT network shall be fully IT compatible devices that mount and communicate directly on the IT infrastructure in the facility. Contractor shall be responsible for coordination with the owner's IT staff to ensure that the BAS will perform in the owner's environment without disruption to any of the other activities taking place on that LAN.
- B. All points of user interface shall be on either local display, standard PCs with appropriate software, a standard Web Browser or a combination of these methods.
- C. The work of the single BAS Contractor shall be as defined individually and collectively in all Sections of this Division specification together with the associated Point Sheets and Drawings and the associated interfacing work as referenced in the related documents.
- D. The BAS work shall consist of the provision of all labor, materials, tools, equipment, software, software licenses, software configurations and database entries, interfaces, wiring, tubing, installation, labeling, engineering, calibration, documentation, samples, submittals, testing, commissioning, training services, permits and licenses, transportation, shipping, handling, administration, supervision, management, insurance, temporary protection, cleaning, cutting and patching, warranties, services, and items, even though these may not be specifically mentioned in these Division documents which are required for the complete, fully functional and commissioned BAS.
- E. Provide a complete, neat and workmanlike installation. Use only manufacturer approved employees who are skilled, experienced, trained, and familiar with the specific equipment, software, standards and configurations to be provided for this Project.
- F. Manage and coordinate the BAS work in a timely manner in consideration of the Project schedules. Coordinate with the associated work of other trades so as to not impede or delay the work of associated trades.
- G. The BAS as provided shall incorporate, as required the following integrated features, functions and

services:

1. Operator information, alarm management and control functions.
2. Information management including monitoring, transmission, archiving, retrieval, and reporting functions.
3. Diagnostic monitoring and reporting of BAS functions.
4. Offsite monitoring and management access.
5. Energy management.
6. Standard applications for terminal HVAC systems.

1.04 QUALITY ASSURANCE

A. General:

1. The Building Automation System Contractor shall be a manufacturer-approved franchised dealer that is regularly engaged in the engineering, programming, installation and service of total integrated building management systems.
2. The BAS Manufacturer shall be a recognized national manufacturer of BAS.
3. The BAS Contractor shall have a fully staffed branch facility within a 100-mile radius of the job site supplying complete maintenance and support services on a 24-hour, 7-day-a-week basis.
4. As evidence and assurance of the contractor's ability to support the Owner's system with service and parts, the contractor must have been in the BAS business for at least the last five (5) years.
5. The Building Automation System architecture shall consist of the products of a manufacturer regularly engaged in the production of Building Automation Systems, and shall be the manufacturer's latest standard of design at the time of bid.

B. Workplace Safety and Hazardous Materials:

1. Provide a safety program in compliance with the Contract Documents.
2. The BAS Contractor shall have a corporately certified comprehensive Safety Certification Manual and a designated Safety Supervisor for the Project.
3. The Contractor and its employees and sub-trades comply with federal, state and local safety regulations.
4. The Contractor shall ensure that all subcontractors and employees have written safety programs in place that covers their scope of work, and that their employees receive the training required by the OSHA having jurisdiction for at least each topic listed in the Safety Certification Manual.
5. Hazards created by the Contractor or its subcontractors shall be eliminated before any further work proceeds.
6. Hazards observed but not created by the Contractor or its subcontractors shall be reported to either the General Contractor or the Owner within the same day. The Contractor shall be required to avoid the hazard area until the hazard has been eliminated.
7. The Contractor shall sign and date a safety certification form prior to any work being performed, stating that the Contractors' company is in full compliance with the Project safety requirements.
8. The Contractor's safety program shall include written policy and arrangements for the handling, storage and management of all hazardous materials to be used in the work in compliance with the requirements of the authority having jurisdiction at the Project site.
9. The Contractor's employees and subcontractor's staff shall have received training as applicable in the use of hazardous materials and shall govern their actions accordingly.

C. Quality Management Program:

1. Designate a competent and experienced employee to provide BAS Project Management. The designated Project Manger shall be empowered to make technical, scheduling and related decisions on behalf of the BAS Contractor. At minimum, the Project Manager shall:
 - a. Manage the scheduling of the work to ensure that adequate materials, labor and other resources are available as needed.
 - b. Manage the financial aspects of the BAS contract.
 - c. Coordinate as necessary with other trades.
 - d. Be responsible for the work and actions of the BAS workforce on site.

1.05 REFERENCES

- A. All work shall conform to the following Codes and Standards, as applicable:
1. National Fire Protection Association (NFPA) Standards
 2. National Electric Code (NEC) and applicable local Electric Code
 3. Underwriters Laboratories (UL) listing and labels
 4. UL 916 Energy Management
 5. NFPA 70 - National Electrical Code
 6. NFPA 90A - Standard For The Installation Of Air Conditioning And Ventilating Systems
 7. Factory Mutual (FM)
 8. American National Standards Institute (ANSI)
 9. National Electric Manufacturer's Association (NEMA)
 10. American Society of Mechanical Engineers (ASME)
 11. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
 12. Air Movement and Control Association (AMCA)
 13. Institute of Electrical and Electronic Engineers (IEEE)
 14. American Standard Code for Information Interchange (ASCII)
 15. Electronics Industries Association (EIA)
 16. Occupational Safety and Health Administration (OSHA)
 17. American Society for Testing and Materials (ASTM)
 18. Federal Communications Commission (FCC) including Part 15, Radio Frequency Devices
 19. Americans Disability Act (ADA)
 20. ANSI/EIA 909.1-A-1999 (LonWorks)
 21. ANSI/ASHRAE Standard 135-2004 (BACnet)
 22. IEEE 802.15.4 ZigBee
- B. In the case of conflicts or discrepancies, the more stringent regulation shall apply.
- C. All work shall meet the approval of the Authorities Having Jurisdiction at the project site.

1.06 SUBMITTALS

- A. Shop Drawings, Product Data, and Samples:
1. The BAS contractor shall submit a list of all shop drawings with submittals dates within 30 days of contract award.
 2. Submittals shall be in defined packages. Each package shall be complete and shall only reference itself and previously submitted packages. The packages shall be as approved by the Architect and Engineer for Contract compliance.
 3. Allow 15 working days for the review of each package by the Architect and Engineer in the scheduling of the total BAS work.
 4. Equipment and systems requiring approval of local authorities must comply with such regulations and be approved. Filing shall be at the expense of the BAS Contractor where filing is necessary. Provide a copy of all related correspondence and permits to the Owner.
 5. Prepare an index of all submittals and shop drawings for the installation. Index shall include a shop drawing identification number, Contract Documents reference and item description.
 6. The BAS Contractor shall correct any errors or omissions noted in the first review.
 7. At a minimum, submit the following:
 - a. BAS network architecture diagrams including all nodes and interconnections.
 - b. Systems schematics, sequences and flow diagrams.
 - c. Points schedule for each point in the BAS, including: Point Type, Object Name, Expanded ID, Display Units, Controller type, and Address.
 - d. Details of all BAS interfaces and connections to the work of other trades.
 - e. Product data sheets or marked catalog pages including part number, photo and description for all products including software.

1.08 RECORD DOCUMENTATION

- A. Operation and Maintenance Manuals:
1. Three (3) copies of the Operation and Maintenance Manuals shall be provided to the Owner's Representative upon completion of the project. The entire Operation and Maintenance Manual shall be furnished on Compact Disc media or DVD, and include the following for the BAS provided:
 - a. Table of contents.
 - b. As-built system record drawings.
 - c. Manufacturer's product data sheets or catalog pages for all products including software.
 - d. System Operator's manuals.
 - e. BAS network diagrams.
 - f. Interfaces to all third-party products and work by other trades.
 2. The Operation and Maintenance Manual CD or DVD shall be self-contained, and include all necessary software required to access the product data sheets. A logically organized table of contents shall provide dynamic links to view and print all product data sheets. Viewer software shall provide the ability to display, zoom, and search all documents.
- B. On-Line Documentation: After completion of all tests and adjustments the contractor shall provide a copy of all as-built information and product data to be installed on a customer designated computer workstation or server.

1.09 WARRANTY

- A. Standard Material and Labor Warranty:
1. Provide a one-year labor and material warranty on the BAS.
 2. If within twelve (12) months from the date of acceptance of product, upon written notice from the owner, it is found to be defective in operation, workmanship or materials, it shall be replaced, repaired or adjusted at the option of the BAS Contractor at the cost of the BAS Contractor.
 3. Maintain an adequate supply of materials within 100 miles of the Project site such that replacement of key parts and labor support, including programming. Warranty work shall be done during BAS Contractor's normal business hours.

PART 2 - PRODUCTS

2.01 GENERAL DESCRIPTION

- A. The Building Automation System (BAS) shall use an open architecture and where applicable support a multi-vendor environment. To accomplish this effectively, the BAS shall not be limited to a single open communication protocol standard, but to also integrate third-party devices and applications via additional protocol and through the latest software standards. The system configuration shall be available for use on the Internet, or intranets using off the shelf, industry standard technology compatible with other owner provided networks.
- B. The Building Automation System shall consist of the following:
1. Supervisory Controllers
 2. Programmable Controllers (HVAC equipment, etc.)
 3. Input, Output Modules
 4. Local Display Devices
 5. Portable Operator's Terminals – Portable PC's
 6. Distributed User Interfaces
 7. Network processing, data storage and communications equipment
 8. Other components required for a complete and working BAS
- C. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, controllers and operator devices, while re-using existing controls equipment.

- D. The system architectural design shall eliminate dependence upon any single device for alarm generation and control execution. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.
- E. Acceptable Systems:
1. Facility Explorer by Johnson Controls (Tridium)
 2. Others per addendum

2.02 BAS ARCHITECTURE

- A. Automation Network:
1. The automation network shall be configured as a Client/Server network with a web server operating on the Client's LAN/WAN. The web browser interface is extended over the LAN/WAN. Monitoring and control of the BAS is available using the web browser interface.
 2. The automation network shall include the option of a PC industry standard of Ethernet TCP/IP. Where used, LAN controller cards shall be standard "off the shelf" products available through normal PC vendor channels.
 3. The BAS shall network multiple user interface clients, system controllers and systems supervisors as required for systems operation.
 4. The automation network option shall be capable of operating at a communication speed of 100 Mbps.
 5. Supervisory Controllers shall reside on the Automation Network
 6. The automation network option will be compatible with other enterprise-wide networks. Where indicated, the automation network shall be connected to the enterprise network and share resources with it by way of standard networking devices and practices.
- B. Control Network:
1. Supervisory Controllers shall provide management over the control network(s) and shall support the following communications protocols:
 - a. BACnet® Standard (ANSI/ASHRAE Standard 135-) MS/TP and Ethernet/IP
 2. The Supervisory Controller shall be BTL (BACnet Testing Laboratories) listed as B-BC (BACnet Building Controller) and support the following data link options:
 - a. BACnet Internet Protocol (IP) (Annex J).
 - b. BACnet IP (Annex J) Foreign.
 - c. ISO 8802-3, Ethernet (Clause 7).
 3. Control networks shall provide either "Peer-to-Peer," Master-Slave, or Supervised Token Passing communications, and shall operate at a minimum communication speed of 9600 baud.
 4. Programmable Controllers shall reside on the control network.
 5. A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided for each controller device (master or slave) that will communicate on the BACnet MS/TP Bus.
 6. The PICS shall be submitted 10 days prior to bidding.
- C. Integration:
1. BACnet Protocol Integration
 - a. The BACnet over Ethernet and BACnet MS/TP shall comply with the ASHRAE BACnet standard 135-2004.
 - b. A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
 - c. The ability to command, share point object data, change of state (COS) data and schedules between the host and BACnet systems shall be provided.

2.03 USER INTERFACE

- A. Browser Based Operator Interface:
1. The system shall be capable of supporting an unlimited number of clients using standard Web

- browser such as Internet Explorer™ or Mozilla Firefox™. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.
2. The Web browser software shall run on any operating system and system configuration that is supported by the Web browser. Systems that require specific machine requirements in terms of processor speed, memory, etc., in order to allow the Web browser to function with the Building Automation System (BAS), shall not be acceptable.
 3. The Web browser client shall support at a minimum, the following functions:
 - a. User log-on identification and password shall be required. If an unauthorized user attempts access, notice of access failure shall be displayed. Security using authentication and encryption techniques to prevent unauthorized access shall be implemented.
 - b. HTML programming shall not be required to display system graphics or data on a Web page. Editing of the Web page shall be allowed if the user desires a specific look or format.
 - c. Storage of the graphical screens shall be in the Supervisory Controller or the server, without requiring any graphics to be stored on the client machine. Systems that require graphics storage on each client are not acceptable.
 - d. Real-time values displayed on a web page shall update automatically without requiring a manual “refresh” of the web page.
 - e. Users shall have administrator-defined access privileges. Depending on the access privileges assigned, the user shall be able to perform the following:
 - 1) Modify common application objects, such as schedules and setpoints in a graphical manner.
 - 2) Commands binary objects to start and stop.
 - 3) View logs and charts.
 - 4) View alarms.
 - f. Graphic screens on the Web Browser client shall support hypertext links to other locations on the Internet or on Intranet sites, by specifying the Uniform Resource Locator (URL) for the desired link.
 4. Alarms
 - a. Alarm feature shall allow user configuration of criteria to create, route, and manage alarms and events. It shall be possible for specific alarms from specific points to be routed to specific alarm recipients. The alarm management portion of the user interface shall, at the minimum, provide the following functions:
 - 1) Allow configuration to generate alarms on any numeric, binary, or data point in the system.
 - 2) Generate alarm records that contain a minimum of a timestamp, original state, acknowledged state, alarm class and priority.
 - 3) Allow the establishment of alarm classes that provide the routing of alarms with similar characteristics to common recipients.
 - 4) Allow a user, with the appropriate security level, to manage alarms - including sorting, acknowledging, and tagging alarms.
 5. Reports and Summaries
 - a. Reports and Summaries shall be generated and directed to the user interface displays, with subsequent assignment to printers, or disk. As a minimum, the system shall provide the following reports:
 - 1) All points in the BAS
 - 2) All points in each BAS application
 - 3) All points in a specific controller
 - 4) All points in a user-defined group of points
 - 5) All points currently in alarm
 - 6) All BAS schedules
 - 7) All user defined and adjustable variables, schedules, interlocks and the like
 - b. Reports shall be exportable to .pdf, .txt, or .csv formats.
 - c. The system shall allow for the creation of custom reports and queries.
 6. Schedules
 - a. A graphical display for time-of-day scheduling and override scheduling of building

- operations shall be provided. At a minimum, the following functions shall be provided:
- 1) Regular schedules
 - 2) Repeating schedules
 - 3) Exception Schedules
- b. Weekly schedules shall be provided for each group of equipment with a specific time use schedule.
 - c. It shall be possible to define one or more exception schedules for each schedule including references to calendars.
 - d. Monthly calendars shall be provided that allow for simplified scheduling of holidays and special days. Holidays and special days shall be user-selected with the pointing device or keyboard.
7. Password
- a. Multiple-level password access protection shall be provided to allow the system manager to assign user interface control, display, and database manipulation capabilities deemed appropriate for each user based on an assigned password.
 - b. Each user shall have the following: a user name, a password, and access levels.
 - c. The system shall provide the capability to require a password of minimum length and require a combination of characters and numerical or special characters.
 - d. When entering or editing passwords, the system shall not echo the actual characters for display on the monitor.
 - e. The system shall provide unlimited flexibility with access rights. A minimum of four levels of access shall be provided along with the ability to customize the system to provide additional levels.
 - f. A minimum of 100 unique passwords shall be supported.
 - g. Operators shall be able to perform only those commands available for their respective passwords. Display of menu selections shall be limited to only those items defined for the access level of the password used to log-on.
 - h. The system shall automatically generate a report of log-on/log-off and system activity for each user.
 - i. All log data shall be available in .pdf, .txt, and .csv formats.
8. Dynamic Color Graphics
- a. The graphics application program shall be supplied as an integral part of the User Interface.
 - b. The graphics applications shall include a create/edit function and a runtime function. The system architecture shall support an unlimited number of graphics documents (graphic definition files) to be generated and executed.
 - c. The graphics shall be able to display real-time data that is acquired, derived, or entered.
 - d. Graphics runtime functions –Each graphic application shall be capable of the following functions:
 - 1) All graphics shall be fully scalable
 - 2) The graphics shall support a maintained aspect ratio.
 - 3) Multiple fonts shall be supported.
 - 4) Unique background shall be assignable on a per graphic basis.
 - e. Operation from graphics – It shall be possible to change values (setpoints) and states in systems controlled equipment within the Web browser interface.
 - f. Graphic editing tool – A graphic editing tool shall be provided that allows for the creation and editing of graphic files. The graphic editor shall be capable of performing/defining all runtime binding.
9. Historical Data Collection
- a. All numeric, binary or data points in the system database shall allow their values to be logged over time (trend log). Each historical record shall include the point's name, a time stamp including time zone, and the point's value.
 - b. The configuration of the historical data collection shall allow for recording data based on change of value or on a user-defined time interval.
 - c. The configuration of the historical data collection shall allow for the collection process to stop or rollover when capacity has been reached.
 - d. A historical data viewing utility shall be provided with access to all history records. This

- e. utility shall allow historical data to be viewed in a table or chart format.
 - e. The history data table view shall allow the user to hide/show columns and to filter data based on time and date. The history data table shall allow exporting to .txt, .csv, or .pdf file formats.
 - f. The historical data chart view shall allow different point histories to be displayed simultaneously, and also provide panning and zooming capabilities.
10. Audit Log
- a. For each log entry, provide the following data;
 - 1) Time and date
 - 2) User ID
 - 3) Change or activity: i.e., Change setpoint, add or delete objects, commands, etc.
11. Database Backup and Storage
- a. The user shall have the ability to backup the Supervisory Controller databases.
- B. Operator BMS Access: The BAS Contractor shall provide client access to Building Automation System from existing personal computer located in project facility. Field verify network access in existing facility. Building Automation System also to be accessible from City of Duluth Headquarters (verify with owner).

2.04 AUTOMATION NETWORK

- A. Supervisory Controller:
- 1. The Supervisory Controller must provide the following hardware features as a minimum:
 - a. Communications
 - 1) One 10/100 Mb Ethernet Port – RJ-45 connection
 - 2) One RS-232 port
 - 3) One RS-485 port (up to 57,600 baud)
 - 4) Optional internal auto-dial/auto-answer 56K modem.
 - Use for remote dial-in.
 - 5) Expandable communications ports including LON, RS485, Modem, Wireless Terminal Equipment Control
 - 6) All required protocol drivers are included.
 - b. Battery Backup
 - 1) Battery backup provided for all on board functions including I/O
 - 2) Battery is monitored and trickle charged
 - 3) Battery maintains processor operation through power failures for a pre-determined interval, and then writes all data to flash memory, shuts the processor down, and maintains the clock for three months.
 - c. Environment
 - 1) Must be capable of operation over a temperature range of 0 °C to 50 °C (32 °F to 122 °F).
 - 2) Must be capable of withstanding storage temperatures of between 0 °C and 60 °C (32 °F to 140 °F).
 - 3) Must be capable of operation over a humidity range of 5% to 95% RH, non-condensing
 - 2. The Supervisory Controller shall be a fully user-programmable device capable of providing all of the capability described in Section 2.3 Part A.
 - 3. Automation network – The Supervisory Controller shall reside on the automation network. Each Supervisory Controller shall support one or more sub-networks of controllers.
 - 4. The Supervisory Controller shall have the capability to communicate directly with Modbus without the use of an additional gateway.
 - 5. The Supervisory Controller shall have the capability to provide secure communications via SSL (Secure Socket Layer).
 - 6. User Interface – Each Supervisory Controller shall have the ability to deliver a web based user interface as previously described. All computers connected physically or virtually to the automation network shall have access to the web based UI.
 - 7. Power Failure – In the event of the loss of normal power, The Supervisory Controller shall

continue to operate for a defined period after which there shall be an orderly shutdown of all programs to prevent the loss of database or operating system software. Flash memory shall be incorporated for all critical controller configuration data.

- a. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions.
 - b. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.
8. Certification – All controllers shall be listed by Underwriters Laboratories (UL).

2.05 DDC SYSTEM CONTROLLERS

A. General Purpose Programmable Controllers (PCG):

1. The General Purpose Programmable Controller (PCG) shall be a fully user-programmable, digital controller that communicates via BACnet MS/TP protocol.
 - a. The PCG shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
 - 1) A BACnet Protocol Implementation Conformance Statement shall be provided for the PCG.
 - 2) The Conformance Statement shall be submitted 10 days prior to bidding.
2. The PCG shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.
3. The PCG shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only shall not be acceptable
4. The PCG shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
5. The PCG shall include troubleshooting LED indicators to identify the following conditions:
 - a. Power On
 - b. Power Off
 - c. Download or Startup in progress, not ready for normal operation
 - d. No Faults
 - e. Device Fault
 - f. Field Controller Bus - Normal Data Transmission
 - g. Field Controller Bus - No Data Transmission
 - h. Field Controller Bus - No Communication
 - i. Sensor-Actuator Bus - Normal Data Transmission
 - j. Sensor-Actuator Bus - No Data Transmission
 - k. Sensor-Actuator Bus - No Communication
6. The PCG shall accommodate the direct wiring of analog and binary I/O field points.
7. The PCG shall support the following types of inputs and outputs:
 - a. Universal Inputs - shall be configured to monitor any of the following:
 - 1) Analog Input, Voltage Mode
 - 2) Analog Input, Current Mode
 - 3) Analog Input, Resistive Mode
 - 4) Binary Input, Dry Contact Maintained Mode
 - b. Binary Inputs - shall be configured to monitor either of the following:
 - 1) Dry Contact Maintained Mode
 - 2) Pulse Counter Mode
 - c. Analog Outputs - shall be configured to output either of the following:
 - 1) Analog Output, Voltage Mode
 - 2) Analog Output, current Mode
 - d. Binary Outputs - shall output the following:

- 1) 24 VAC Triac
 - e. Configurable Outputs - shall be capable of the following:
 - 1) Analog Output, Voltage Mode
 - 2) Binary Output Mode
 8. The PCG shall have the ability to reside on a Field Controller Bus (FC Bus).
 - a. The FC Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard protocol SSPC-135, Clause 9.
 - b. The FC Bus shall support communications between the PCGs and the Supervisory Controller.
 - c. The FC Bus shall also support Expansion I/O (PCX) communications with the PCG and with the Supervisory Controller.
 - d. The FC Bus shall operate at a maximum distance of 15,000 Ft. between the PCG and the furthest connected device.
 9. The PCG shall have the ability to monitor and control a network of sensors and actuators over a Sensor-Actuator Bus (SA Bus).
 - a. The SA Bus shall be a Master-Slave/Token-Passing (MS/TP) Bus supporting BACnet Standard Protocol SSPC-135, Clause 9.
 - b. The SA Bus shall support up to 10 devices per trunk.
 - c. The SA Bus shall operate at a maximum distance of 1,200 Ft. between the PCG and the furthest connected device.
 10. The PCG shall have the capability to execute complex control sequences involving direct wired I/O points as well as input and output devices communicating over the FC Bus or the SA Bus.
 11. The PCG shall support, but not be limited to, the following:
 - a. Chilled water/central plant automation applications including but not limited to:
 - 1) the selection and sequencing of up to 8 chillers of different sizes
 - 2) the selection and sequencing of up to 8 (each) primary and secondary chilled water pumps of varying pump capacities
 - 3) the selection and sequencing of up to 8 condenser water pumps
 - 4) the selection and sequencing of cooling towers and bypass valve, including single speed, multi-speed, and Vernier control
 - 5) a proven and documented central cooling plant optimization program that incorporates custom equipment efficiency profiles, without rewriting software code, in order to meet the building load using the least amount of energy as calculated
 - 6) the use of advanced control algorithms that apply equipment specific parameters, including operational limits and efficiency profiles, in order to determine equipment start and runtime preferences
 - 7) the identification of the most efficient equipment combination and automatic control of state and speed of all necessary equipment to balance runtime, optimize timing and sequencing and ensure the efficiency and stability of the central cooling plant
 - 8) the control definition for the chiller plant in a single FX-PCG, as supported by available memory and point Input/Output (I/O), or capable of being split across multiple FX-PCGs
 - b. Heating central plant applications
 - c. Built-up air handling units for special applications
 - d. Terminal and packaged units
 - e. Special programs as required for systems control
- B. Programmable Controller Expansion I/O Modules (PCX):
1. The Programmable Controller Expansion I/O Module (PCX) provides additional inputs and outputs for use in the PCG.
 2. The PCX shall communicate with the PCG over the FC Bus or the SA Bus.
 3. The PCX shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
 - a. A BACnet Protocol Implementation Conformance Statement shall be provided for the PCG.
 - b. The Conformance Statement shall be submitted 10 days prior to bidding.
 4. The PCX shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.

5. The PCX shall have a minimum of 4 points to a maximum of 17 points.
6. The PCX shall support the following types of inputs and outputs:
 - a. Universal Inputs - shall be configured to monitor any of the following:
 - 1) Analog Input, Voltage Mode
 - 2) Analog Input, Current Mode
 - 3) Analog Input, Resistive Mode
 - 4) Binary Input, Dry Contact Maintained Mode
 - b. Binary Inputs - shall be configured to monitor either of the following:
 - 1) Dry Contact Maintained Mode
 - 2) Pulse Counter Mode
 - c. Analog Outputs - shall be configured to output either of the following:
 - 1) Analog Output, Voltage Mode
 - 2) Analog Output, current Mode
 - d. Binary Outputs - shall output the following:
 - 1) 24 VAC Triac
 - e. Configurable Outputs - shall be capable of the following:
 - 1) Analog Output, Voltage Mode
 - 2) Binary Output Mode
7. The PCX shall include troubleshooting LED indicators to identify the following conditions:
 - a. Power On
 - b. Power Off
 - c. Download or Startup in progress, not ready for normal operation
 - d. No Faults
 - e. Device Fault
 - f. Normal Data Transmission
 - g. No Data Transmission
 - h. No Communication

2.06 FIELD DEVICES

A. Network Sensors (NS):

1. The Network Sensors (NS) shall have the ability to monitor the following variables as required by the systems sequence of operations:
 - a. Outside Temperature
 - b. Discharge Air Setpoint
 - c. Occupied heat set point
 - d. Unoccupied heat set point
 - e. Current space temperature
 - f. Other variables as required by plans, addenda and sequence and specifications.
2. The NS shall transmit the information back to the controller on the Sensor-Actuator Bus (SA Bus) using BACnet Standard protocol SSPC-135, Clause 9.
3. The NS shall be BACnet Testing Labs (BTL) certified and carry the BTL Label.
 - a. The NS shall be tested and certified as a BACnet Smart Sensors (B-SS).
 - b. A BACnet Protocol Implementation Conformance Statement shall be provided for the NS.
 - c. The Conformance Statement shall be submitted 10 days prior to bidding.
4. The Network Zone Temperature Sensors shall include the following items:
 - a. A backlit Liquid Crystal Display (LCD) to indicate the Temperature, Humidity and Setpoint
 - b. An LED to indicate the status of the Override feature
 - c. A button to toggle the temperature display between Fahrenheit and Celsius
 - d. A button to initiate a timed override command
 - e. Available in either surface mount or wall mount
 - f. Available with either screw terminals or phone jack
5. The Network Discharge Air Sensors shall include the following:
 - a. 4 inch or 8 inch duct insertion probe
 - b. 10 foot pigtail lead
 - c. Dip Switches for programmable address selection

- d. Ability to provide an averaging temperature from multiple locations
- e. Ability to provide a selectable temperature from multiple locations
6. The Network CO2 Zone Sensors shall include the following:
 - a. Available in either surface mount or wall mount
 - b. Available with screw terminals or phone jack

2.07 SYSTEM TOOLS

A. Supervisory Controller Toolset:

1. Device embedded toolset shall provide the following capabilities in a graphical environment using a standard Web browser:
 - a. Device and point management
 - b. Scheduling, alarming and trending setup
 - c. Creation and binding of graphics
 - d. Time management
 - e. User management
2. Toolset provides additional engineering capabilities including:
 - a. Editable table based point listings.
 - b. Automatically generated graphics for standard applications.

B. Programmable Controller Tool:

1. The Programmable Controller Tool shall be capable of programming the Programmable Controllers.
 - a. The Programmable Controller tool shall provide the capability to configure, simulate, and commission all Programmable Controllers.
 - b. The Programmable Controller tool shall allow the application logic to be run in Simulation Mode to verify its sequence of operation.
 - c. The Programmable Controller tool shall contain a library of standard applications to be used for configuration.

C. Wireless Commissioning Converter:

1. The converter shall provide a temporary wireless connection between the SA or FC Bus and a wireless enabled portable PC.
2. The converter shall support downloading and troubleshooting Programmable Controllers from the PC over the wireless connection.
3. The converter shall employ Bluetooth Wireless Technology.
4. The converter shall be powered through a connection to either the Sensor-Actuator (SA) or the Field Controller (FC) Bus.
5. The converter shall operate over a minimum of thirty (30) feet within a building.
6. The converter shall have LED indicators to provide information regarding the following conditions:
 - a. Power - On/Off
 - b. Fault – Fault/No Fault
 - c. SA/FC Bus – Bus Activity/ No Bus Activity
 - d. Blue – Bluetooth Communication Established/ Bluetooth Communication Not Established

2.08 INPUT DEVICE CHARACTERISTICS

- ### A. General Requirements: Installation, testing, and calibration of all sensors, transmitters, and other input devices shall be provided to meet the system requirements.

B. Temperature Sensors:

1. General Requirements:
 - a. Sensors and transmitters shall be provided, as outlined in the input/output summary and sequence of operations.
 - b. The temperature sensor shall be of the resistance type, and shall be either two-wire 1000 ohm

nickel RTD, or two-wire 1000 ohm platinum RTD.

- c. The following point types (and the accuracy of each) are required, and their associated accuracy values include errors associated with the sensor, lead wire, and A to D conversion:

Point Type	Accuracy
Chilled Water	± 0.5 °F, ± 0.3 °C
Room Temp	± 0.5 °F, ± 0.3 °C.
Duct Temperature	± 0.5 °F, ± 0.3 °C.
All Others	± 0.75 °F, ± 0.4 °C.

2. Room Temperature Sensors
 - a. Room sensors shall be constructed for either surface or wall box mounting.
 - b. Room sensors shall have the following options when specified:
 - 1) Setpoint adjustment providing a ± 3 degree (adjustable) range
 - 2) Dial adjustment for setpoint value or warmer or cooler requests. The dial shall also initiate temporary occupancy during unoccupied times.
 - 3) A momentary override request push button for activation of after-hours operation
 - 4) Backlit LCD temperature display shall display temperature and setpoint with units.
 3. Room Command Module
 - a. Room sensors shall be constructed for either surface or wall box mounting.
 - b. Room sensors shall have the following capabilities:
 - 1) Remote Setpoint Adjustment
 - 2) Override request push button with LED status for activation of after-hours operation
 - 3) Service connection
 4. Outside Air Sensors
 - a. Outside air sensors shall be designed to withstand the environmental conditions to which they will be exposed. They shall also be provided with a solar shield.
 - b. Sensors exposed to wind velocity pressures shall be shielded by a perforated plate that surrounds the sensor element.
 - c. Temperature transmitters shall be of NEMA 3R construction and rated for ambient temperatures.
 5. Duct Mount Sensors
 - a. Duct mount sensors shall mount in an electrical box through a hole in the duct, and be positioned so as to be easily accessible for repair or replacement.
 - b. Duct sensors shall be insertion type and constructed as a complete assembly, including lock nut and mounting plate.
 - c. For outdoor air duct applications, a weatherproof mounting box with weatherproof cover and gasket shall be used.
- C. Smoke Detectors: Ionization type air duct detectors shall be furnished as specified elsewhere in Division 16 for installation under Division 15. All wiring for air duct detectors shall be provided under Division 16, Fire Alarm System.
- D. Status and Safety Switches:
1. General Requirements
 - a. Switches shall be provided to monitor equipment status, safety conditions, and generate alarms at the BAS when a failure or abnormal condition occurs. Safety switches shall be provided with two sets of contacts and shall be interlock wired to shut down respective equipment.

2.09 OUTPUT DEVICE CHARACTERISTICS

- A. Actuators:
1. General Requirements
 - a. Damper and valve actuators shall be electronic and/or pneumatic, as specified in the System Description section.
 2. Electronic Damper Actuators

- a. Electronic damper actuators shall be direct shaft mount.
 - b. Modulating and two-position actuators shall be provided as required by the sequence of operations. Damper sections shall be sized based on actuator manufacturer's recommendations for face velocity, differential pressure and damper type. The actuator mounting arrangement and spring return feature shall permit normally open or normally closed positions of the dampers as required. All actuators (except terminal units) shall be furnished with mechanical spring return unless otherwise specified in the sequences of operations. All actuators shall have external adjustable stops to limit the travel in either direction and a gear release to allow manual positioning.
 - c. Modulating actuators shall accept 24 VAC or VDC power supply, consume no more than 15 VA and be UL listed. The control signal shall be 2-10 VDC or 4-20 mA, and the actuator shall provide a clamp position feedback signal of 2-10 VDC. The feedback signal shall be independent of the input signal and may be used to parallel other actuators and provide true position indication. The feedback signal of one damper actuator for each separately controlled damper shall be wired back to a terminal strip in the control panel for troubleshooting purposes.
 - d. Two-position or open/closed actuators shall accept 24 or 120 VAC power supply and be UL listed. Isolation, smoke, exhaust fan, and other dampers, as specified in the sequence of operations, shall be furnished with adjustable end switches to indicate open/closed position or be hard wired to start/stop associated fan. Two-position actuators, as specified in sequences of operations as "quick acting," shall move full stroke within 20 seconds. All smoke damper actuators shall be quick acting.
 - e. Acceptable manufacturers: Johnson Controls, Schneider Electric, Belimo, Mamac.
- B. External Manual Override Stations:
1. External manual override stations shall provide the following:
 - a. An integral ON/OFF switch shall override the controlled device pilot relay.
 - b. A status input to the Building Automation System shall indicate whenever the switch is not in the automatic position.
 - c. A Status LED shall illuminate whenever the output is ON.
 - d. An Override LED shall illuminate whenever the HOA switch is in either the HAND or OFF position.
 - e. Contacts shall be rated for a minimum of 1 ampere at 24 VAC.

2.10 MISCELLANEOUS DEVICE CHARACTERISTICS

- A. Local Control Panels:
1. All control panels shall be factory constructed, incorporating the BAS manufacturer's standard designs and layouts. All control panels shall be UL inspected and listed as an assembly and carry a UL 508 label listing compliance. Control panels shall be fully enclosed, with perforated sub-panel, hinged door, and slotted flush latch.
 2. In general, the control panels shall consist of the DDC controller(s), display module as specified and indicated on the plans, and I/O devices—such as relays, transducers, and so forth—that are not required to be located external to the control panel due to function. Where specified the display module shall be flush mounted in the panel face unless otherwise noted.
 3. All I/O connections on the DDC controller shall be provide via removable or fixed screw terminals.
 4. Low and line voltage wiring shall be segregated. All provided terminal strips and wiring shall be UL listed, 300-volt service and provide adequate clearance for field wiring.
 5. All wiring shall be neatly installed in plastic trays or tie-wrapped.
 6. A convenience 120 VAC duplex receptacle shall be provided in each enclosure, fused on/off power switch, and required transformers.
- B. Thermostats: Electric room thermostats of the heavy-duty type shall be provided for unit heaters, cabinet unit heaters, and ventilation fans, where required. All these items shall be provided with concealed adjustment. Finish of covers for all room-type instruments shall match and, unless otherwise indicated or

specified, covers shall be manufacturer's standard finish.

PART 3 - EXECUTION

3.01 BAS SPECIFIC REQUIREMENTS

- A. Graphic Displays:
 - 1. Provide a color graphic system flow diagram display for each system with all points as indicated on the point list. All terminal unit graphic displays shall be from a standard design library.
 - 2. User shall access the various system schematics via a graphical penetration scheme and/or menu selection. .

- B. Custom Reports: Provide custom reports as required for this project:

- C. Actuation / Control Type:
 - 1. Primary Equipment
 - a. Controls shall be provided by equipment manufacturer as specified herein.
 - b. All damper and valve actuation shall be electric.
 - 2. Air Handling Equipment
 - a. All air handlers shall be controlled with a HVAC-DDC Controller
 - b. All damper and valve actuation shall be electric.
 - 3. Terminal Equipment
 - a. Terminal Units (VAV, UV, etc.) shall have electric damper and valve actuation.
 - b. All Terminal Units shall be controlled with HVAC-DDC Controller)

3.02 INSTALLATION PRACTICES

- A. BAS Wiring:
 - 1. All conduit, wiring, accessories and wiring connections required for the installation of the Building Automation System, as herein specified, shall be provided by the BAS Contractor unless specifically shown on the Electrical Drawings under Division 16 Electrical. All wiring shall comply with the requirements of applicable portions of Division 16 and all local and national electric codes, unless specified otherwise in this section.
 - 2. All BAS wiring materials and installation methods shall comply with BAS manufacturer recommendations.
 - 3. The sizing, type and provision of cable, conduit, cable trays, and raceways shall be the design responsibility of the BAS Contractor. If complications arise, however, due to the incorrect selection of cable, cable trays, raceways and/or conduit by the BAS Contractor, the Contractor shall be responsible for all costs incurred in replacing the selected components.
 - 4. Class 2 Wiring
 - a. All Class 2 (24 VAC or less) wiring shall be installed in conduit unless otherwise specified.
 - b. Conduit is not required for Class 2 wiring in concealed accessible locations. Class 2 wiring not installed in conduit shall be supported every 5' from the building structure utilizing metal hangers designed for this application. Wiring shall be installed parallel to the building structural lines. All wiring shall be installed in accordance with local code requirements.
 - 5. Class 2 signal wiring and 24 VAC power can be run in the same conduit. Power wiring 120 VAC and greater cannot share the same conduit with Class 2 signal wiring.
 - 6. Provide for complete grounding of all applicable signal and communications cables, panels and equipment so as to ensure system integrity of operation. Ground cabling and conduit at the panel terminations. Avoid grounding loops.

- B. BAS Line Voltage Power Source:
 - 1. 120-volt AC circuits used for the Building Automation System shall be taken from panel boards and circuit breakers provided by Division 16.
 - 2. Circuits used for the BAS shall be dedicated to the BAS and shall not be used for any other purposes.

3. DDC terminal unit controllers may use AC power from motor power circuits.
- C. BAS Raceway:
1. All wiring shall be installed in conduit or raceway except as noted elsewhere in this specification. Minimum control wiring conduit size 1/2".
 2. Where it is not possible to conceal raceways in finished locations, surface raceway (Wiremold) may be used as approved by the Architect.
 3. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
 4. Flexible Metal Conduit shall be used for vibration isolation and shall be limited to 3 feet in length when terminating to vibrating equipment. Flexible Metal Conduit may be used within partition walls. Flexible Metal Conduit shall be UL listed.
- D. Penetrations:
1. Provide fire stopping for all penetrations used by dedicated BAS conduits and raceways.
 2. All openings in fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
 3. All wiring passing through penetrations, including walls shall be in conduit or enclosed raceway.
 4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true, and square.
- E. BAS Identification Standards:
1. Node Identification. All nodes shall be identified by a permanent label fastened to the enclosure. Labels shall be suitable for the node location.
 - a. Cable types specified in Item A shall be color coded for easy identification and troubleshooting.
- F. BAS Panel Installation:
1. The BAS panels and cabinets shall be located as indicated at an elevation of not less than 2 feet from the bottom edge of the panel to the finished floor. Each cabinet shall be anchored per the manufacturer's recommendations.
 2. The BAS contractor shall be responsible for coordinating panel locations with other trades and electrical and mechanical contractors.
- G. Input Devices:
1. All Input devices shall be installed per the manufacturer recommendation
 2. Locate components of the BAS in accessible local control panels wherever possible.
- H. HVAC Input Devices – General:
1. All Input devices shall be installed per the manufacturer recommendation
 2. Locate components of the BAS in accessible local control panels wherever possible.
 3. The mechanical contractor shall install all in-line devices such as temperature wells, pressure taps, airflow stations, etc.
 4. Input Flow Measuring Devices shall be installed in strict compliance with ASME guidelines affecting non-standard approach conditions.
 5. Outside Air Sensors
 - a. Sensors shall be mounted on the North wall to minimize solar radiant heat impact or located in a continuous intake flow adequate to monitor outside air conditions accurately.
 - b. Sensors shall be installed with a rain proof, perforated cover.
 6. Water Differential Pressure Sensors
 - a. Differential pressure transmitters used for flow measurement shall be sized to the flow-sensing device.
 - b. Differential pressure transmitters shall be supplied with tee fittings and shut-off valves in the high and low sensing pick-up lines.
 - c. The transmitters shall be installed in an accessible location wherever possible.
 7. Building Differential Air Pressure Applications (-1" to +1" w.c.):

- a. Transmitter's exterior sensing tip shall be installed with a shielded static air probe to reduce pressure fluctuations caused by wind.
- b. The interior tip shall be inconspicuous and located as shown on the drawings.
- 8. Duct Temperature Sensors:
 - a. Duct mount sensors shall mount in an electrical box through a hole in the duct and be positioned so as to be easily accessible for repair or replacement.
 - b. The sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate.
 - c. For ductwork greater in any dimension than 48 inches or where air temperature stratification exists such as a mixed air plenum, utilize an averaging sensor.
 - d. The sensor shall be mounted to suitable supports using factory approved element holders.
- 9. Space Sensors:
 - a. Shall be mounted per ADA requirements.
 - b. Provide lockable tamper-proof covers in public areas and/or where indicated on the plans.
- 10. Low Temperature Limit Switches:
 - a. Install on the discharge side of the first water or steam coil in the air stream.
 - b. Mount element horizontally across duct in a serpentine pattern insuring each square foot of coil is protected by 1 foot of sensor.
 - c. For large duct areas where the sensing element does not provide full coverage of the air stream, provide additional switches as required to provide full protection of the air stream.
- 11. Air Differential Pressure Status Switches:
 - a. Install with static pressure tips, tubing, fittings, and air filter.
- 12. Water Differential Pressure Status Switches:
 - a. Install with shut off valves for isolation.
- I. HVAC Output Devices:
 - 1. All output devices shall be installed per the manufacturer's recommendation. The mechanical contractor shall install all in-line devices such as control valves, dampers, airflow stations, pressure wells, etc.
 - 2. Actuators: All control actuators shall be sized capable of closing against the maximum system shut-off pressure. The actuator shall modulate in a smooth fashion through the entire stroke. When any pneumatic actuator is sequenced with another device, pilot positioners shall be installed to allow for proper sequencing.
 - 3. Control Dampers: Shall be opposed blade for modulating control of airflow. Parallel blade dampers shall be installed for two position applications.
 - 4. Control Valves: Shall be sized for proper flow control with equal percentage valve plugs. The maximum pressure drop for water applications shall be 5 psi. The maximum pressure drop for steam applications shall be 7 psi.
 - 5. Electronic Signal Isolation Transducers: Whenever an analog output signal from the Building Management System is to be connected to an external control system as an input (such as a chiller control panel), or is to receive as an input a signal from a remote system, provide a signal isolation transducer. Signal isolation transducer shall provide ground plane isolation between systems. Signals shall provide optical isolation between systems.

3.03 TRAINING SERVICES

- A. The BAS contractor shall provide the following training services:
 - 1. One day of on-site orientation by a system technician who is fully knowledgeable of the specific installation details of the project. This orientation shall, at a minimum, consist of a review of the project as-built drawings, the BAS software layout and naming conventions, and a walk through of the facility to identify panel and device locations.

3.04 COMMISSIONING REQUIREMENTS

- A. Fully commission all aspects of the Building Automation System work.

- B. Acceptance Check Sheet:
1. Prepare a check sheet that includes all points for all functions of the BAS as indicated on the point list included in this specification.
 2. Submit the check sheet to the Engineer for approval
 3. The Engineer will use the check sheet as the basis for acceptance with the BAS Contractor.
- C. Promptly rectify all listed deficiencies and submit to the Engineer that this has been done.

END OF SECTION

SECTION 23 09 93 - SEQUENCE OF OPERATIONS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- C. 23 52 00 - Boilers & Accessories
- D. 23 34 00 - HVAC Fans

1.02 DESCRIPTION OF WORK

- A. Control sequences are hereby defined as the manner and method by which automatic temperature controls function. Requirements for each type of operation are specified in this Section.
- B. Operating equipment, devices and system components required for automatic temperature control systems are specified in other Division 23 Controls and Instrumentation sections of these specifications.

1.03 SUBMITTALS

- A. Shop Drawings. Submit shop drawings for each system automatically controlled, containing the following information:
 - 1. Schematic flow diagram of all new mechanical systems.
 - 2. Label each control device with setting or adjustable range of control.
 - 3. Indicate each control panel required with internal and external piping and wiring clearly indicated. Provide detail of panel face, including controls, instruments, and labeling.
 - 4. Include narrative description of sequence of operation addressing all modes of function for each control component.
- B. Maintenance Data. Include copy of shop drawings in each maintenance manual.

PART 2 - PRODUCTS (Not Applicable)**PART 3 - EXECUTION****3.01 GAS-FIRED, DIRECT FIRE MAKE-UP AIR UNIT (EQUIPMENT #1)**

- A. Provide Forge LC-1 LCD DDC control package or prior approved equal. Locate remote panel at location on wall approved by Owner.
- B. Provide Forge LCD remote thermostat/unit controller (or prior approved equal) to maintain constant discharge air temperature (adjustable) at unit.
- C. Provide relay to energize make-up air unit (Equipment #1) when exhaust fan #3 is energized. Exhaust fan #3 to be energized first, motorized outside air damper to open second, Equipment #1 to energize upon positive confirmation outside air damper is in open position. Equipment #1 to maintain fixed discharge air temperature of 72°F (22°C) (adjustable) controlling heat input from discharge air controller.
- D. Provide winter/summer switch, with Fan only summer operation to activate solenoid shut-off valve on gas train.

E. Provide Outside Air Sensor with Make-Up air unit

Points List (Viewed/Controlled on Front End including Graphical Display)

1. Outside Temperature
2. Discharge Temperature Setpoint
3. Occupied Heat Set Point
4. Unoccupied Heat Set Point
5. Current Space Temperature
6. Display Unit Alarm Status
7. Up to 20 additional points to be programmed into Front End (at clients request)

3.02 GAS-FIRED, DIRECT FIRE MAKE-UP AIR UNIT (EQUIPMENT #2)

- A. Provide Forge LC-1 LCD DDC control package or prior approved equal. Locate remote panel at location on wall approved by Owner.
- B. Provide LCD remote thermostat/unit controller to maintain constant discharge air temperature (adjustable) at unit.
- C. Provide relay to energize make-up air unit (Equipment #2) when exhaust fan #4 is energized. Exhaust fan #4 to be energized first, motorized outside air damper to open second, Equipment #2 to energize upon positive confirmation outside air or solar wall motorized damper (as applicable) is open. Equipment #2 to maintain fixed discharge air temperature of 72°F (22°C) (adjustable) controlling heat input from discharge air controller.
- D. Provide winter/summer switch, with Fan only summer operation to activate solenoid shut-off valve on gas train.
- E. Provide Outside Air Sensor with Make-Up Air unit

Points List (Viewed/Controlled on Front End including Graphical Display)

8. Outside Temperature
9. Discharge Temperature Setpoint
10. Occupied Heat Set Point
11. Unoccupied Heat Set Point
12. Current Space Temperature
13. Display Unit Alarm Status
14. Up to 20 additional points to be programmed into Front End (at clients request)

3.03 SIDEWALL EXHAUST FAN (EQUIPMENT #3)

- A. Fan to be interlocked with make-up air unit Equipment #1. Equipment #3 (exhaust fan) to be controlled by occupied/unoccupied schedule (full 365-day/24-hour coverage) to be programmed and coordinated with Owner and fully programmed by Control Contractor. This to include occupied time schedule and temperature setpoint and unoccupied time schedule and temperature setpoint. This to include all holidays and weekends.
- B. Exhaust fan to be energized by gas detection alarm (any one of CO or NO₂ sensors) as an override function to occupied/unoccupied schedule. Exhaust fan (Equipment #3) must be energized upon gas detection alarm status as an override to any occupied/unoccupied schedule. Manual override on/off function shall be provided by wall controller in space. Manual ON function to be initially programmed to one hour (provide fully adjustable manual on run-time capability).
- C. Provide manual override ON/OFF switch on wall (see plan for location) to provide manual ON

runtime (1 hour initial setting). Manual override on capability to be programmable from 0-12 hours in minute increments (minimum). System to revert back to occupied/unoccupied system control at end of manual on timeframe.

- D. Motorized damper control: Exhaust fan #3 has two exhaust pickup locations, one “high” and one “low” with motorized damper on each branch. Provide system controller on wall (see location on plan) to fully modulate control of dampers between 100% High/0% Low and 0% High/100% low with full control between these ranges. Controller to indicate midpoint (50% High/50%Low). High/Low mix to be programmed to always total 100%.

3.04 ROOF-MOUNTED EXHAUST FAN (EQUIPMENT #4)

- A. Fan to be interlocked with make-up air unit Equipment #2. Equipment #4 (exhaust fan) to be controlled by occupied/unoccupied (full 365 day/24-hour coverage). To be programmed and coordinated with Owner and fully programmed by Control Contractor. This to include occupied time schedule and temperature setpoint and unoccupied time schedule and temperature setpoint. This to include all weekends and holidays.
- B. Exhaust fan to be energized by gas detection alarm (any of CO or NO₂ sensors) as an override function to occupied/unoccupied schedule. Exhaust fan (Equipment #4) must be energized upon gas detection alarm status as an override to any occupied/unoccupied schedule. Manual override on/off function shall be provided by wall controller in space. Manual ON function to be initially programmed to one hour (provide fully adjustable manual on run-time capability).
- C. Provide manual override ON/OFF switch on wall (see plan for location) to provide manual ON runtime (1 hour initial setting). Manual override on capability to be programmable from 0-12 hours in minute increments (minimum). System to revert back to occupied/unoccupied system control at end of manual on timeframe.

3.05 SOLAR WALL (ASSOCIATED WITH EQUIPMENT #2 – MAKE-UP AIR UNIT)

- A. Monitor solar wall air temperature.
- B. When solar wall air temperature is above Equipment #2 discharge air set point, the solar wall damper shall be closed and Equipment #2 OA louver damper shall be open.
- C. When solar wall air temperature is below Equipment #2 discharge air set point and above outside air temperature, the solar wall damper shall be open and Equipment #2 OA louver damper shall be closed.

3.06 GAS-FIRED UNIT HEATERS (EQUIPMENT #8 & #9)

- A. Provide programmable (7-day) occupied/unoccupied thermostat (4 thus).
- B. Unit heater to be programmed to 72°F occupied and 64°F unoccupied (adjustable) room temperature setpoint.
- C. Coordinate with Owner occupied/unoccupied time schedule and fully program each thermostat (4 thus).
- D. Coordinate with Owner initial occupied/unoccupied temperature setpoints.
- E. Unit heaters (4 thus) are not controlled by DDC; each have individual thermostat.

3.07 GAS-FIRE FURNACE

- A. Furnace to be controlled by DDC system, fully occupied/unoccupied control.

- B. Provide local thermostat to have local control of temperature setpoint with $\pm 3^{\circ}\text{F}$ range of DDC setpoint (fully adjustable).
- C. Provide temporary override capability at local thermostat with one-hour override timeframe (fully adjustable) to DDC occupied/unoccupied schedule.
- D. OA damper to be open in occupied mode and closed in unoccupied mode. Fan to be in ON mode during occupied time.

3.08 LIGHTING CONTROLS

- A. Provide four (4) zones of scheduled ON/OFF programmable control (see Electrical Plan e1.1).
- B. Provide six (6) stations of manual ON/OFF override control stations on wall for local control and override of programmed control. Manual ON/OFF control to take effect until next scheduled event in programmed control (see Electrical Plan e1.1).

3.09 GAS DETECTION SYSTEM (Equipment #7 and associated sensors Eq. #5 and #6)

- A. Gas detection system to be connected to Building Automation System for control.
- B. Alarm or Normal status to be indicated by Building Automation System. Each sensor to be individually displayed and status indication.

END OF SECTION

SECTION 23 11 00 - NATURAL GAS SYSTEMS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 19 - Meters & Gauges for HVAC Piping, Ductwork & Equipment
- C. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- D. 23 05 53 - Identifications for HVAC Piping & Equipment

1.02 SCOPE OF WORK

- A. Install natural gas piping as shown on drawings and as specified in this Section.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Installation and replacement of gas piping, gas utilization equipment or accessories, and repair and servicing of equipment shall be performed only by a qualified installer. The term qualified is defined as experienced in such work (experienced shall mean having a minimum of 5 previous projects similar in size and scope to this project), familiar with precautions required, and has complied with the requirements of the authority having jurisdiction. Upon request, submit evidence of such qualifications to the Engineer.
- B. Qualifications for Welding Processes and Operators: Comply with the requirements of ASME Boiler and Pressure Vessel Code, "Welding and Brazing Qualification."
- C. Regulatory Requirements: Comply with the requirements of the following codes:
 - 1. NFPA 54 - National Fuel Gas Code, for gas piping materials and components, gas piping installations, and inspection, testing, and purging of gas piping systems.
 - 2. State Plumbing Code.

1.04 DELIVERY, STORAGE & HANDLING

- A. Handling Flammable Liquids: Remove and legally dispose of liquid from drips in existing gas piping and handled cautiously to avoid spillage or ignition. Notify the gas supplier. Handle flammable liquids used by the installer with proper precautions, and do not leave on the premises from the end of one working day to the beginning of the next.

1.05 SEQUENCING & SCHEDULING

- A. Notification of Interruption of Service: Except in the case of an emergency, notify all affected users when the gas supply is to be turned off.
- B. Work Interruptions: When interruptions in work occur while repairs or alterations are being made to an existing piping system, leave the system in safe condition.
- C. Coordinate the installation of pipe sleeves for foundation wall penetrations.

1.06 EXTRA MATERIALS

- A. Valve Wrenches: Furnish to Owner, with receipt, 2 valve wrenches for each type of gas valve installed requiring same.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Gas Cocks: Jenkins Bros.; Lunkenheimer Co.; NIBCO, Inc.; Powell Co.; Stockham.

2.02 PIPING & TUBING MATERIALS

- A. Refer to Part 3, Article "PIPE APPLICATION," for identification of systems where the below specified pipe and fitting materials are used.
- B. Steel Pipe: ASTM A53/A53M, Schedule 40, seamless, black steel pipe, beveled ends.
- C. Galvanized Steel Pipe: ASTM A53/A53M, Schedule 40.

2.03 FITTINGS

- A. Malleable-Iron Threaded Fittings: Class 150, standard pattern, for threaded joints. Threads shall conform to ASME/ANSI Standard.
- B. Steel Fittings: Seamless or welded, for welded joints.
- C. Steel Flanges and Flanged Fittings including bolts, nuts and gaskets of the following material group, end connections and facings:
 - 1. Material Group: 1.1.
 - 2. End Connections: Butt Welding.
 - 3. Facings: Raised Face.

2.04 JOINING MATERIALS

- A. Brazing Filler Metals: AWS A5.8, Classification BAg-1 (Silver).
 - 1. Joint Compound: Suitable for the gas being handled.
 - 2. Gasket Material: Thickness, material, and type suitable for gas to be handled, and for design temperatures and pressures.

2.05 PIPING SPECIALTIES

- A. Gas Meters: Diaphragm-type, positive displacement gas meters with aluminum cases, temperature compensated, with internal corrosion-resistant components; threaded ends for 2" and smaller, flanged ends for 2-1/2" and larger; for gas working pressures, specific gravity and volume flow indicated. Verify meter with local Gas Utility.
- B. Unions: Class 150; black malleable iron; female pattern; brass to iron seat; ground joint.
- C. Dielectric Unions: Class 250; malleable iron and cast bronze; with threaded or soldered end connections suitable for pipe to be joined; designed to isolate galvanic and stray current corrosion.
- D. Protective Coating: When piping will be in contact with material or atmosphere exerting a corrosion action, pipe and fittings shall be field painted with Endcor 8898 silicone-alkyd copolymer, self-priming coating
 - 1. Manufacturer: Dampney Endcor #8898
 - 2. Apply per manufacturer's recommendations.
 - 3. Color to be grey.

2.06 VALVES

- A. Equal to Milwaukee B475 threaded forged brass two-piece ball valve with chrome-plated ball, blowout proof stem and reinforced PTFE seats in accordance with UL-MHKZ (600#) CSA 3371-08/CSA 3371-88 (1/2#), CSA 3371-92/CSA 3371-12 (5#), CSA 3371-94 (125#). Provide stem extensions where required.
- B. Gas Cocks 2" and Smaller: 150 psi WOG, bronze body, straightaway pattern, square head, threaded ends.
- C. Solenoid Valves: Aluminum body, 120V AC, 60 Hz, Class B, continuous duty molded coil; NEMA 4 coil enclosure; electrically opened/electrically closed; dual coils; normally closed; UL and FM approved and labeled.
- D. Gas Line Pressure Regulators: Single stage, steel jacketed, corrosion-resistant gas pressure regulators; with atmospheric vent, elevation compensator; with threaded ends for 2" and smaller, flanged ends for 2-1/2" and larger; for inlet and outlet gas pressures, specific gravity, and volume flow indicated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Precautions: Before turning off the gas to the premises, or section of piping, turn off all equipment valves. Perform a leakage test as specified in "FIELD QUALITY CONTROL" below to determine that all equipment is turned off in the piping section to be affected.
- B. Conform with the requirements of NFPA 54 for the prevention of accidental ignition.

3.02 PIPE APPLICATIONS

- A. Install steel pipe with threaded joints and fittings for 2" and smaller and with welded joints for 2-1/2" and larger.
- B. Piping in contact with material or atmosphere exerting corrosion action, pipe, fitting and threads shall be galvanized or have protective coating.

3.03 PIPING INSTALLATIONS

- A. Conform to the requirements of NFPA 54 - National Fuel Gas Code.
- B. Locations and Arrangements: Drawings (plans, schematics and diagrams) indicate the general location and arrangement of piping systems. Design locations and arrangements of piping take into consideration pipe sizing, flow direction, slope of pipe, expansion and other design considerations. So far as practical, install piping as indicated.
- C. Concealed Locations: Except as specified below, install concealed gas piping in an airtight conduit constructed of Schedule 40, seamless black steel with welded joints. Vent conduit to the outside and terminate with a screened vent cap.
 - 1. Above-Ceiling Locations: Gas piping may be installed in accessible above-ceiling spaces (subject to the approval of the authority having jurisdiction), whether or not such spaces are used as a plenum. Valves shall not be located in such spaces.
 - 2. In Floors: Piping installed in floors shall have protective wrapping specified in PART 2 above. Piping cast in concrete slabs shall be surrounded with a minimum of 1-1/2" of concrete and shall not be in physical contact with other metallic structures such as reinforcing rods or electrically

neutral conductors. Piping shall not be embedded in concrete slabs containing quick-set additives or cinder aggregate.

3. Piping in Partitions: Concealed piping shall not be located in solid partitions. Tubing shall not be run inside hollow walls or partitions unless protected against physical damage. This does not apply to tubing passing through walls or partitions.
 4. Prohibited Locations: Do not install gas piping in or through a circulating air duct, clothes chute, chimney or gas vent, ventilating duct, dumb waiter or elevator shaft. This does not apply to accessible above-ceiling space specified above.
- D. Drips and Sediment Traps: Install a drip leg at points where condensate may collect, at the outlet of the gas meter and in a location readily accessible to permit cleaning and emptying. Do not install drips where condensate is likely to freeze.
1. Construct drip and sediment traps using a tee fitting with the bottom outlet plugged or capped. Use a minimum of 3 pipe diameters in length for the drip leg. Use same size pipe for drip leg as the connected pipe.
- E. Use fittings for all changes in direction and all branch connections.
- F. Install exposed piping at right angles or parallel to building walls. Diagonal runs are not permitted unless expressly indicated.
- G. Install piping free of sags or bends and with ample space between piping to permit proper insulation applications.
- H. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.
- I. Install piping tight to slabs, beams, joists, columns, walls and other permanent elements of the building. Provide space to permit insulation applications, with 1" clearance outside the insulation. Allow sufficient space above removable ceiling panels to allow for panel removal.
- J. Locate groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- K. Install gas piping at a uniform grade of 1/4" in 15', upward to risers and from the risers to the meter, or service regulator when meter is not provided, or the equipment.
- L. Make reductions in pipe sizes using eccentric reducer fittings installed with the level side down.
- M. Connect branch outlet pipes from the top of horizontal lines, not from the bottom.
- N. Hanger, supports and anchors are specified in Division 15 Section "Mechanical Related Work." Conform to the table below for maximum spacing of supports:

1. Steel Pipe:

<u>SIZE (NPS)</u>	<u>SPACING IN FEET</u>	<u>MIN. ROD SIZE-INCHES</u>
1/2	5	3/8
3/4 to 1-1/4	6	3/8
1-1/2 to 3 (horizontal)	12	1/2
3-1/2 to 5 all sizes (vertical)	every floor level	

- O. Install unions in pipes 2" and smaller, adjacent to each valve, at final connections each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.
- P. Install dielectric unions where piping of dissimilar metals are joined.
- Q. Install flanges on valves, apparatus, and equipment having 2-1/2" and larger connections.
- R. Install strainers on the supply side of each control valve, pressure reducing valve, pressure regulating valve, solenoid valve and elsewhere as indicated.

3.04 PIPE JOINT CONSTRUCTION

- A. Welded Joints: Comply with the requirements in ASME Boiler and Pressure Vessel Code, Section IX.
- B. Brazed Joints: Comply with the procedures contained in the AWS "Brazing Manual."
 - 1. WARNING: Some filler metals contain compounds which produce highly toxic fumes when heated. Avoid breathing fumes.
 - 2. CAUTION: Remove stems, seats, and packing of valves, and accessible internal parts of piping specialties before brazing.
 - 3. Fill the tubing and fittings during brazing with an inert gas (nitrogen or carbon dioxide) to prevent formation of scale.
 - 4. Heat joints to proper and uniform temperature.
- C. Threaded Joints: Tapered pipe threads for field cut threads. Join pipe, fittings and valves as follows:
 - 1. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint. Refer to NFPA 54 for guide for number and length of threads for field threading steel pipe.
 - 2. Align threads at point of assembly.
 - 3. Apply appropriate tape or thread compound to the external pipe threads.
 - 4. Assemble joint to appropriate thread depth. When using a wrench on valves, place the wrench on the valve end into which the pipe is being threaded.
 - 5. Damaged Threads: Do not use pipe with threads which are corroded or damaged. If a weld opens during cutting or threading operations, that portion of pipe shall not be used.
- D. Flanged Joints: Align flange surfaces parallel. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly to appropriate torque specified by the bolt manufacturer.

3.05 VALVE APPLICATIONS

- A. The drawings indicate valve types, locations and arrangements.
- B. Shutoff Duty: Use gas cocks specified in Part 2 above.

3.06 VALVE INSTALLATIONS

- A. Install valves in accessible locations, protected from physical damage. Tag valves with a metal tag

attached with a metal chain indicating the piping systems supplied.

- B. Install a gas cock upstream of each gas pressure regulator. Where two gas pressure regulators are installed in series in a single gas line, a manual valve is not required at the second regulator.
- C. Install pressure relief or pressure limiting devices so they can be readily operated to determine if the valve is free; so they can be tested to determine the pressure at which they will operate; and examined for leakage when in the closed position.

3.07 TERMINAL EQUIPMENT CONNECTIONS

- A. Install gas cock upstream and within 6' of gas appliance. Install a union or flanged connection downstream from the gas cock to permit removal of controls.
- B. Sediment Traps: Install a tee fitting with the bottom outlet plugged or capped as close to the inlet of the gas appliance as practical. Drip leg shall be a minimum of 3 pipe diameters in length.

3.08 ELECTRICAL BONDING & GROUNDING

- A. Install above ground portions of gas piping systems, upstream from equipment shutoff valves electrically continuous and bonded to a grounding electrode in accordance with NFPA 70 - "National Electrical Code."
- B. Do not use gas piping as a grounding electrode.
- C. Conform to NFPA 70 - "National Electrical Code" for electrical connections between wiring and electrically operated control devices.

3.09 FIELD QUALITY CONTROL

- A. Piping Tests: Inspect, test and purge natural gas systems in accordance with NFPA 54 and local utility requirements.

END OF SECTION

SECTION 23 31 13 - METAL DUCTWORK**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- C. 23 05 53 - Identification for HVAC Piping & Equipment
- D. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- E. 23 07 13 - Duct Insulation
- F. 23 33 00 - Air Duct Accessories

1.02 SCOPE OF WORK

- A. Install ductwork as indicated on drawings and as by specified in this section.

1.03 SUBMITTALS

- A. Record Drawings: At project closeout, submit record drawings of installed metal ductwork and ductwork products.
- B. Maintenance Data: Submit maintenance data and parts lists for metal ductwork materials and products. Include this data, product data, shop drawings and record drawings in maintenance manual.

1.04 DELIVERY, STORAGE & HANDLING

- A. Protection: Protect shop-fabricated and factory-fabricated ductwork, accessories and purchased products from damage during shipping, storage and handling. Prevent end damage and prevent dirt and moisture from entering ducts and fittings.
- B. Storage: Where possible, store ductwork inside and protect from weather. Where necessary to store outside, store above grade and enclose with waterproof wrapping.

PART 2 - PRODUCTS**2.01 DUCTWORK MATERIALS & ACCEPTABLE MANUFACTURERS (DUCT LINER)**

- A. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.
- B. Sheetmetal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A653/A653M, lockforming quality; with G90 zinc coating in accordance with ASTM A525; and mill phosphatized for exposed locations.
- C. Duct Liner: Approved manufacturer is Armacell Advanced Insulation.

2.02 MISCELLANEOUS DUCTWORK MATERIALS

- A. Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.
- B. Duct Liner: Closed cell, complying with NFPA 90A or 90B, 1" thick, R-4.2, 0.2% moisture absorption, maximum flame-spread index of 25 and smoke-developed index of 50 when tested according to ASTM

C411.

- C. Duct Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or 90B.
- D. Duct Liner Fasteners: As recommended by manufacturer.
- E. Duct Sealant: Non-hardening, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.
- F. Duct Cement: Non-hardening migrating mastic or liquid neoprene-based cement, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for cementing fitting components, or longitudinal seams in ductwork.
- G. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.
 - 1. Except where space is indicated as "High Humidity" area, interior support materials of not less than 1/4" diameter or 3/16" thickness may be plain (not galvanized).
 - 2. For exposed stainless steel ductwork, provide matching stainless steel support materials.
 - 3. For aluminum ductwork, provide aluminum support materials except where materials are electrolytically separated from ductwork.
- H. Flexible Ducts: Either spiral-wound spring steel with flameproof vinyl sheathing, or corrugated aluminum; complying with UL 181.
 - 1. Where installed in unconditioned spaces other than return air plenums, provide 1" thick continuous flexible fiberglass sheath with vinyl vapor barrier jacket.

2.03 FABRICATION

- A. Shop fabricate ductwork of gages and reinforcement complying with SMACNAs "HVAC Duct Construction Standards."
- B. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with centerline radius equal to associated duct width; and fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30° for contracting tapers and 20° for expanding tapers.
- C. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible.
- D. Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners.

2.04 FACTORY-FABRICATED LOW PRESSURE DUCTWORK

- A. At installer's option, provide factory-fabricated duct and fittings, in lieu of shop-fabricated duct and fittings.
- B. Material: Galvanized sheet steel complying with ASTM A527, lockforming quality, with ASTM A525, G90 zinc coating, mill phosphatized.

- C. Gage: 26-gage minimum for round and oval ducts and fittings, 4" through 24" diameter.
- D. Elbows: One-piece construction of 90° and 45° elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.
- E. Divided Flow Fittings: 90° tees, constructed with saddle tap spot welded and bonded to duct fitting body.
- F. Exposed Spiral Acoustical Duct: Construction, in general, shall be comprised of an airtight, outer pressure shell, a 1" fiberglass insulation layer, and a perforated metal liner that completely covers the insulation throughout the system. All size listings are based on the inner liner diameter. Perforations are not to exceed 3/32" diameter. The percentage of open area shall be 22%. The inner liners of both duct and fittings are to be adequately supported by metal spacers welded in position to maintain spacing and concentricity. An inner coupling shall be provided to align the inner liners of joining pieces to maintain good airflow conditions. This alignment may be accomplished by extending the inner liner of the fitting for slip joint into the duct or by use of a double concentric coupling with spacers.

PART 3 - EXECUTION

3.01 INSTALLATION OF METAL DUCTWORK

- A. Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight (3% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.
- B. Inserts: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in work.
- C. Field Fabrication: Complete fabrication of work at project as necessary to match shop-fabricated work and accommodate installation requirements.
- D. Routing: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, details and notations or, if not otherwise indicated, run ductwork in shortest route which does not obstruct useable space or block access for servicing building and its equipment. Hold ducts close to walls, overhead construction, columns and other structural and permanent enclosure elements of building. Limit clearance to 1/2" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork for 1" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.
- E. Electrical Equipment Spaces: Do not route ductwork through transformer vaults and their electrical equipment spaces and enclosures.
- F. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheetmetal flanges of same gage as duct. Overlap opening on 4 sides by at least 1-1/2". Fasten to duct and substrate.
 - 1. Where ducts pass through fire-rated floors, wall or partitions, provide firestopping between duct and substrate, in accordance with requirements of Division 07 Section "Firestopping."

- G. Coordination: Coordinate duct installation with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
- H. Installation: Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards.

3.02 INSTALLATION OF DUCT LINER

- A. Install duct liner in accordance with SMACNA HVAC Duct Construction Standards.

3.03 INSTALLATION OF FLEXIBLE DUCTS

- A. Maximum Length: For any duct run using flexible ductwork, do not exceed 5'0" extended length.
- B. Installation: Install in accordance with Section III of SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."

3.04 FIELD QUALITY CONTROL

- A. Leakage Tests: After each duct system which is constructed for duct classes over 3" is completed, test for duct leakage in accordance with SMACNA HVAC Air Duct Leakage Test Manual. Repair leaks and repeat tests until total leakage is less than 1% of system design airflow.

3.05 EQUIPMENT CONNECTIONS

- A. Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

3.06 ADJUSTING & CLEANING

- A. Clean ductwork internally, unit by unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration. Documentation of work performed shall comply with ASHRAE 62.1-2004, Section 7.2.4 "Ventilation System Startup."
- B. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

END OF SECTION

SECTION 23 33 00 - AIR DUCT ACCESSORIES**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- C. 23 05 53 - Identification for HVAC Piping & Equipment
- D. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- E. 23 07 13 - Duct Insulation
- F. 23 31 13 - Metal Ductwork

1.02 SCOPE OF WORK

- A. Install ductwork accessories as indicated on drawings and in schedules and by requirements of this Section.

1.03 SUBMITTALS

- A. Shop Drawings: Submit manufacturer's assembly-type shop drawings for each type of ductwork accessory showing interfacing requirements with ductwork, method of fastening or support, and methods of assembly of components.
- B. Maintenance Data: Submit manufacturer's maintenance data including parts lists for each type of duct accessory. Include this data, product data and shop drawings in maintenance manual.

PART 2 - PRODUCTS**2.01 APPROVED MANUFACTURERS**

- A. Manual Dampers: Air Balance; Cesco; Greenheck; McGill; Metalaire; Nailor; Penn; Pottorff; Ruskin; Vent Products
- B. Turning Vanes: Anemostat; Ductmate; Durodyne; Metalaire; Nailor; Ward
- C. Duct Access Door: Cesco; Ductmate; Flexmaster; Greenheck; McGill; Nailor; Ventfabrics; Ward
- D. Flexible Connections: Ductmate; Durodyne; Engineered Flexible Products; Flexaust; Ventfabrics; Ward
- E. Motorized Dampers: Air Balance; Cesco; Durodyne; Greenheck; McGill; Metalaire; Nailor; Penn; Price; Ruskin

2.02 DAMPERS

- A. Low Pressure Manual Dampers: Provide dampers of single-blade type or multiblade type, constructed in accordance with SMACNA "HVAC Duct Construction Standards."
- B. Counterbalanced Dampers: Provide dampers with parallel blades, counterbalanced and factory set to relieve at indicted static pressure. Construct blades of 6063T5 extruded aluminum, provide Zytel ball bearings. Construct frame .125" wall thickness. Provide adjustable counterbalance equal to Ruskin CBD6.

2.03 TURNING VANES

- A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance

with SMACNA "HVAC Duct Construction Standards."

- B. Manufactured Turning Vanes: Provide turning vanes constructed of 1-1/2" wide curved blades set at 3/4" o.c., supported with bars perpendicular to blades set at 2" o.c., and set into side strips suitable for mounting in ductwork.

2.04 DUCT HARDWARE

- A. Provide duct hardware manufactured by one manufacturer for all items on project for the following:
 - 1. Quadrants Locks: Provide for each damper, quadrant lock device on one end of shaft; and end bearing plate on other end for damper lengths over 12". Provide extended quadrant locks and end extended bearing plates for externally insulated ductwork.

2.05 DUCT ACCESS DOORS

- A. Provide where indicated duct access doors of size indicated.
- B. Construction: Construct of same or greater gage as ductwork served, provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide one size hinged, other side with one handle-type latch for doors 12" high and smaller, two handle-type latches for larger doors.

2.06 FLEXIBLE CONNECTIONS

- A. Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

2.07 DRIP PANS

- A. Provide 2" drip pan in the following locations:
 - 1. Vertical Roof Penetration - Locate at bottom of duct riser to fan.
 - 2. Horizontal Sidewall Penetration - Locate as close to penetration as possible.
- B. Construction - Construct of same or greater gauge as ductwork served, seal construction watertight.

2.08 MOTORIZED DAMPERS

- A. Provide dampers constructed in accordance with SMACNA "HVAC Duct Construction Standards."
 - 1. Extruded aluminum airfoil blade, low leakage
 - 2. Opposed blade
 - 3. Bronze Oilite bearings
 - 4. Silicone rubber blade seals and stainless steel jamb seals
 - 5. Externally mount extended actuator shaft, confirm side
 - 6. Actuators provided by Temperature Control

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with

work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF DUCTWORK ACCESSORIES

- A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.
- B. Install turning vanes in square or rectangular 90° elbows in supply, return and exhaust air systems.
- C. Install access doors to open against system air pressure with latches operable from either side, except outside only where duct is too small for person to enter.
- D. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.
- E. Each damper shall have access panel for maintenance and inspection.

3.03 FIELD QUALITY CONTROL

- A. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories as required to obtain proper operation and leakproof performance.

3.04 ADJUSTING & CLEANING

- A. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers and adjust for proper action.
- B. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

3.05 EXTRA STOCK

- A. Furnish extra fusible links to Owner, one link for every 10 installed of each temperature range; obtain receipt.

END OF SECTION

SECTION 23 34 00 - HVAC FANS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 13 - Motor Requirements for HVAC Equipment
- C. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- D. 23 05 48 - Vibration & Seismic Controls for HVAC Piping & Equipment
- E. 23 05 53 - Identification for HVAC Piping & Equipment
- F. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- G. 23 31 13 - Metal Ductwork

1.02 SCOPE OF WORK

- A. Install HVAC fans as shown on drawings and as specified in this section.

1.03 SUBMITTALS

- A. Shop drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, required clearances, components and location and size of field connections.
- B. Wiring diagrams that detail power, signal and control wiring. Differentiate between manufacturer-installed wiring and field-installed wiring.
- C. Maintenance data for air handling units for inclusion in operating and maintenance manual.

1.04 DELIVERY, STORAGE & HANDLING

- A. Lift and support units with the manufacturer's designated lifting or supporting points.
- B. Disassemble and reassemble units as required for movement into the final location following manufacturer's written instructions.
- C. Deliver fan units as a factory-assembled unit to the extent allowable by shipping limitations, with protective crating and covering.

1.05 SEQUENCING & SCHEDULING

- A. Coordinate the installation of roof curbs, equipment supports and roof and wall penetrations.
- B. Coordinate the size and location of structural steel support members.

1.06 EXTRA MATERIALS

- A. Furnish one additional complete set of belts for each belt-driven fan.

PART 2 - PRODUCTS**2.01 APPROVED MANUFACTURERS**

- A. Centrifugal Roof Ventilators: Acme; Ammerman Company, Inc.; Breidert; Carnes Company, Inc.; Cook (Loren) Co.; Greenheck Fan Corp.; ILG Industries, Inc.; Jenn Industries, Inc.; Penn Ventilator Co.; Quietaire Corp.; Trane; U.S. Fans; Twin City Fan.

- B. Centrifugal Wall Ventilators - Acme; Ammerman Company, Inc.; Carnes Company, Inc.; Cook (Loren) Co.; Greenheck Fan Corp.; ILG Industries, Inc.; Jenn Industries, Inc.; Penn Ventilator Co.; Twin City Fan.

2.02 FANS, GENERAL

- A. Provide fans that are factory fabricated and assembled, factory tested, and factory finished with indicated capacities and characteristics.
- B. Fans and Shafts: Statically and dynamically balanced and designed for continuous operation at the maximum rated fan speed and motor horsepower.
1. Fan Shaft: Turned, ground and polished steel designed to operate at no more than 70% of the first critical speed at the top of the speed range of the fan's class.
- C. Belt Drives: Factory mounted with final alignment and belt adjustment made after installation.
1. Service Factor: 1.4.
- D. Belts: Oil resistant, non-sparking, and non-static.
- E. Motors and Fan Wheel Pulleys: Adjustable pitch for use with motors through 15 HP; fixed pitch for use with motors larger than 15 HP. Select pulley so that pitch adjustment is at the middle of the adjustment range at fan design conditions.
1. Belt Guards: Provide steel belt guards for motors mounted on the outside of the fan cabinet.
- F. Shaft Bearings: Provide type indicated, having a median life "Rating Life" (AFBMA L₅₀) of 200,000, calculated in accordance with AFBMA Standard 9 for ball bearings and AFBMA Standard 11 for roller bearings.
- G. Factory Finish: The following finishes are required:
1. Sheetmetal Parts: Prime coating prior to final assembly.
2. Exterior Surfaces: Baked-enamel finish coat after assembly.

2.03 CENTRIFUGAL ROOF VENTILATORS

- A. General Description: Belt-driven or direct-drive as indicated, centrifugal consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base and accessories.
- B. Housing: Heavy-gage, removable, spun-aluminum, dome top and outlet baffle; square, one-piece, hinged aluminum base with venturi inlet cone.
1. Up-Blast Units - Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains.
- C. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.
- D. Belt-Driven Drive Assembly: Resiliently mounted to the housing with the following features:
1. Pulleys: Cast-iron, adjustable-pitch.
2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
3. Fan Shaft: Turned, ground and polished steel drive shaft keyed to wheel hub.

4. Fan and Motor isolated from exhaust air stream.
- E. Accessories: The following items are required as indicated:
1. Disconnect Switch: Nonfusible type, with thermal overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 2. Bird Screens: Remove ½" mesh, 16-gage, aluminum or brass wire.
 3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base, factory set to close when fan stops as scheduled.
 4. Dampers - Motor-operated, parallel-blade, volume control dampers mounted in curb base.
 - a. Blades - Die-formed sheet aluminum.
 - b. Frame - Extruded aluminum with waterproof, felt blade seals.
 - c. Linkage - Non-ferrous metals, connecting blades to counter weight or operator.
 - d. Operators - Manufacturer's standard electric motor.
 - e. Operators - Manufacturer's standard pneumatic motor.
 5. Special Coating - Herisite coating as scheduled.
 6. Special Construction - Sparkproof construction as scheduled.
- F. Roof Curbs: By the General Contractor.

2.04 CENTRIFUGAL WALL VENTILATORS

- A. General Description - Belt-driven or direct-drive as indicated, centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and accessories.
- B. Housing: Heavy-gage, removable, spun-aluminum, dome top and outlet baffle; venturi design fan inlet cone.
- C. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.
- D. Belt-Driven Drive Assembly: Resiliently mounted to the housing with the following features:
1. Pulleys: Cast-iron, adjustable-pitch.
 2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 3. Fan Shaft: Turned, ground and polished steel drive shaft keyed to wheel hub.
 4. Fan and Motor isolated from exhaust air stream.
- E. Accessories: The following items are required as indicated:
1. Disconnect Switch: Nonfusible type, with thermal overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 2. Bird Screens: Removable, ½" mesh, 16-gage aluminum or brass wire.
 3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base, factory set to close when fan stops.

4. Dampers - Motor-operated, parallel-blade dampers mounted in curb base.
 - a. Blades - Die-formed sheet aluminum.
 - b. Frame - Extruded aluminum with waterproof, felt blade bumpers.
 - c. Linkage - Non-ferrous metals.
 - d. Operators - Manufacturer's standard electric motor.
 - e. Operators - Manufacturer's standard pneumatic motor.

2.05 MOTORS

- A. Torque Characteristics: Sufficient to accelerate the driven loads satisfactorily.
- B. Motor Sizes: Minimum sizes and electrical characteristics as indicated. If not indicated, large enough so that the driven load will not require the motor to operate in the service factor range.
- C. Temperature Rating: 50°C maximum temperature rise at 40°C ambient for continuous duty at full load (Class A Insulation).
- D. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors.
- E. Motor Construction: NEMA Standard MG 1, general purpose, continuous duty, Design B. Provide permanent-split capacitor classification motors for shaft-mounted fans and capacitor start classification for belted fans.
 1. Bases: Adjustable.
 2. Bearings: The following features are required:
 - a. Ball or roller bearings with inner and outer shaft seals.
 - b. Grease lubricated.
 - c. Designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor.
 3. Enclosure Type: The following features are required:
 - a. Open dripproof motors where satisfactorily housed or remotely located during operation.
 - b. Guarded dripproof motors where exposed to contact by employees or building occupants.
 4. Overload Protection: Built-in, automatic reset, thermal overload protection.
 5. Noise Rating: Quiet.
 6. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction and special features.
 7. Starters, Electrical Devices and Wiring: Electrical devices and connections are specified in Division 26.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Install fans level and plumb, in accordance with manufacturer's written instructions. Support units as described below, using the vibration control devices indicated.
- B. Support utility set on equipment isolators and roof supports using housed spring isolators. Secure units

to anchor bolts installed in equipment base.

- C. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.
 - 1. Installation of roof curbs by the General Contractor.
- D. Suspended Units - Suspend units from structural steel support frame using threaded steel rods and vibration isolation springs.
- E. Arrange installation of units to provide access space around air handling units for service and maintenance.

3.02 CONNECTIONS

- A. Duct installation and connections are specified in other sections. Make final duct connections with flexible connections.
- B. Electrical Connections: The following requirements apply:
 - 1. Electrical power wiring is specified in Division 26.
 - 2. Grounding: Connect unit components to ground in accordance with the National Electrical Code.

3.03 ADJUSTING, CLEANING & PROTECTING

- A. Adjust damper linkages for proper damper operation.
- B. Clean unit cabinet interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheel and cabinet.

3.04 COMMISSIONING

- A. Final Checks Before Startup: Perform the following operations and checks before startup:
 - 1. Remove shipping blocking and bracing.
 - 2. Verify unit is secure on mountings and supporting devices and that connections for piping, ductwork and electrical are complete. Verify proper thermal overload protection is installed in motors, starters and disconnects.
 - 3. Perform cleaning and adjusting specified in this Section.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operations. Reconnect fan drive system, align belts and install belt guards.
 - 5. Lubricate bearings, pulleys, belts and other moving parts with factory-recommended lubricants.
 - 6. Verify manual and automatic volume control and that fire and smoke dampers in connected ductwork systems are in the full-open position.
 - 7. Disable automatic temperature control operators.
- B. Starting procedures for fans:
 - 1. Energize motor; verify proper operation of motor, drive system and fan wheel. Adjust fan to indicated RPM.

- a. Replace fan and motor pulleys as required to achieve design conditions.
2. Measure and record motor electrical values for voltage and amperage.
- C. Shut unit down and reconnect automatic temperature control operators.

END OF SECTION

SECTION 23 37 00 - AIR OUTLETS & INLETS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- C. 23 31 13 - Metal Ductwork
- D. 23 33 00 - Air Duct Accessories

1.02 SCOPE OF WORK

- A. Install air outlets and inlets as indicated by drawings and schedules and by requirements of this Section.

1.03 SUBMITTALS

- A. Shop Drawings: Submit manufacturer's assembly-type shop drawings for each type of air outlet and inlet, indicating materials and methods of assembly of components.
- B. Maintenance Data: Submit maintenance data, including cleaning instructions for finishes, and spare parts lists. Include this data, product data and shop drawings in maintenance manuals.

1.04 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Deliver air outlets and inlets wrapped in factory-fabricated fiberboard type containers. Identify on outside of container type of outlet or inlet and location to be installed. Avoid crushing or bending and prevent dirt and debris from entering and settling in devices.
- B. Store air outlets and inlets in original cartons and protect from weather and construction work traffic. Where possible, store indoors; when necessary to store outdoors, store above grade and enclose with waterproof wrapping.

PART 2 - PRODUCTS**2.01 APPROVED MANUFACTURERS**

- A. Diffusers/Registers/Grilles: Metalaire, Carnes, Krueger, Nailor, Titus, Tuttle & Bailey, Price
- B. Louvers: American Warming & Ventilating, Cesco, Greenheck, Industrial Louvers, Louvers & Dampers, Nailor, Penn, Reliable Architectural Louvers, Ruskin, Safe-Air

2.02 CEILING AIR DIFFUSERS

- A. Except as otherwise indicated, provide manufacturer's standard ceiling air diffusers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated; and as required for complete installation.
- B. Performance: Provide ceiling air diffusers that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
- C. Ceiling Compatibility: Provide diffusers with border styles that are compatible with adjacent ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems which will contain each type of ceiling air diffuser.

- D. Types: Provide ceiling diffusers of type, capacity and with accessories and finishes as listed on diffuser schedule. The following requirements shall apply to nomenclature indicated on schedule:

2.03 REGISTERS & GRILLES

- A. Except as otherwise indicated, provide manufacturer's standard registers and grilles where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated; and as required for complete installation.
- B. Performance: Provide registers and grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device as listed in manufacturer's current data.
- C. Surface Compatibility: Provide registers and grilles with border styles that are compatible with adjacent systems, and that are specifically manufactured to fit into construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of construction which will contain each type of register and grille.
- D. Types: Provide registers and grilles of type, capacity and with accessories and finishes as listed on register and grille schedule.

2.04 LOUVERS

- A. Except as otherwise indicated, provide manufacturer's standard louvers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated; and as required for complete installation.
- B. Performance: Provide louvers that have maximum free area, and minimum pressure drop for each type as listed in manufacturer's current data.
- C. Substrate Compatibility: Provide louvers with frame and sill styles that are compatible with adjacent substrate and that are specifically manufactured to fit into construction openings with accurate fit and adequate support for weatherproof installation. Refer to general construction drawings and specifications for types of substrate which will contain each type of louver.
- D. Materials: Construct of aluminum extrusions, ASTM B221, Alloy 6063-T52. Weld units or use stainless steel fasteners. Color to be selected by Architect. Any color may be selected and shall be from factory, not limited to manufacturer's standard options. Field painting not allowed.
- E. Louver Screens: On inside face of exterior louvers, provide 1/2" square mesh anodized aluminum wire bird screens mounted in removable extruded aluminum frames.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which air outlets and inlets are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended functions.
- B. Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of air outlets and inlets with other work.

- C. Locate ceiling air diffusers, registers and grilles as indicated on general construction "Reflected Ceiling Plans." Unless otherwise indicated, locate units in center of acoustical ceiling modules.
- D. All register, grille, and diffuser connections shall have a minimum 2" collar as required by Code.

END OF SECTION

SECTION 23 54 00 - FURNACES**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 13 - Motor Requirements for HVAC Equipment
- C. 23 05 93 - Testing, Adjusting & Balancing for HVAC
- D. 23 11 00 - Natural Gas Systems
- E. 23 31 13 - Metal Ductwork

1.02 SCOPE OF WORK

- A. Install furnaces and accessories complete with controls required by this section and as indicated on drawings and schedules.

1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Product Data including weights and dimensions and data on features and components. Include plan and elevation views of units, minimum clearances, and data on ratings and capacities.
- C. Maintenance Data for products for inclusion in "Operating and Maintenance Manual" specified in Division 01.
- D. Wiring Diagrams from manufacturers detailing electrical requirements for power and control wiring for furnaces. Include ladder-type wiring diagrams for interlock and control wiring required for field installation. Differentiate between portions of wiring that are factory installed and portions that are to be field installed.

1.04 QUALITY ASSURANCE

- A. Comply with NFPA 70, "National Electrical Code."
- B. NRTL Listing: Provide electrical components specified in this Section that are listed and labeled.
 - 1. Terms "Listed" and Labeled: As defined in the "National Electrical Code," Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

1.05 MAINTENANCE SERVICE

- A. Maintenance Service: Provide maintenance of furnaces for a period of 12 months commencing with substantial completion, using factory-authorized service representatives.
- B. Basic Services: A minimum of two systematic, routine maintenance visits on a seasonal basis at times coordinated with the Owner. In addition, respond to service calls within 24 hours of notification of trouble. Adjust and replace defective parts and components with original manufacturer's replacement items. At each visit, perform maintenance services recommended by the manufacturer for the maintenance interval and season existing at the time. Repeat adjustment required under "Commissioning" article in Part 3 of this Section as needed to improve heating results.

1.06 EXTRA MATERIALS

- A. General: Furnish extra materials matching products installed, as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.
 - 1. Disposable Air Filters: Furnish a quantity equal to 200% of the number of filters installed.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Gas Furnaces: Carrier; Lennox; Trane.

2.02 FURNACES, GENERAL

- A. Type: Gas-fired, high efficiency.
- B. Configuration: Upflow.
- C. Gas-Fired Furnaces and Accessory Items: NFPA 54, "National Fuel Gas Code."
 - 1. AGA Approval: Furnaces shall bear the label of the American Gas Association.
 - 2. Type of Gas: Furnaces shall be listed for use with natural gas.
- D. Provide furnace types and minimum ratings and capacities as indicated.
- E. Provide furnaces that are factory assembled, piped, wired and tested.
- F. Cabinet: Steel with foil-faced, glass fiber interior insulation. Lift-out panels expose burners, and all other items requiring access for maintenance.
- G. Main Fan: Centrifugal-type, factory-balanced, resilient-mounted steel.
- H. Motors: Energy-efficient type as specified in Division 23 Section. Totally enclosed, with internal thermal protection and permanent lubrication.

2.03 FURNACES, ADDITIONAL SUPPLIED EQUIPMENT

- A. Provide two (2) condensate pumps, Little Giant Model #VCMA-20ULS, 35 GPH @ 12' head, or prior approved equal. Route condensate as shown on drawings.

2.04 GAS-FIRED FURNACES, HIGH EFFICIENCY

- A. General: Comply with ANSI Z21.47, Gas-Fired Central Furnaces.
- B. Efficiency: AFUE 90%, minimum.
- C. Ignition: Electric spark with flame sensor, or direct-sensing, silicon carbide hot surface igniter.
- D. Automatic Fan Thermal Switch: Delays fan start until discharge air is heated. Delays fan shutdown until air cools to comfort threshold.
- E. Control Transformer: 120 VAC/24 VAC.
- F. Heat Exchanger: Stainless steel.

- G. Combustion Air Source: Outside via combustion air inlet pipe.

2.05 CONTROLS

- A. General: Include control components required for satisfactory operation of furnaces and auxiliary equipment in all seasons, including:
1. Control Transformer: 24 VAC output, factory-installed, and wired in furnace.
 2. Thermostat: 24 VAC solid-state, 7-day programmable, microprocessor-based wall-mounting unit with automatic switching from heating to cooling, preferential rate control, multiple temperature presets selectable by day and time, and battery backup protection of program settings against power failure.
 3. Relays: As required to achieve specified operation.
 4. Thermostat to be controlled by DDC and connected to Building Management System. Local thermostat to provide + 1 - 3° local temperature control and occupied/unoccupied local override control for programmable override timeframe (initial setting 1 hour).

2.06 AIR CLEANING

- A. Filter: 1", disposable, fiberglass type in sheetmetal rack.

2.07 FINISHES

- A. External Casings and Cabinets: Baked enamel over corrosion-resistant treated surface or powder coating.

PART 3 - EXECUTION

3.01 INSTALLATION & CONNECTION

- A. Installation and connection of gas-fired furnaces and associated fuel and vent features and systems shall be in accordance with NFPA 54, applicable local codes and regulations, and manufacturer's published installation instructions.
1. Connect gas piping in accordance with Division 23 Section "Natural Gas Systems."
 2. Connect vents in accordance with manufacturer's requirements.
 3. Connect condensate drain pans using Type M copper tubing with streamline drainage fittings and soldered joints. Extend to nearest equipment drain or floor drain. Construct vented, deep trap at connection to drain pan and install cleanouts at changes in direction. Terminate to suit local code requirements, except where stricter methods are indicated.
- B. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base where installation conditions require.
- C. Controls: Install thermostats where indicated.
- D. Connect ducts in accordance with Division 23 Section "Metal Ductwork."

3.02 COMMISSIONING

- A. Test functions, operations, and control sequences and protective features. Adjust to assure operation is in accordance with specifications.
- B. Correct deficiencies identified by tests and observations and retest until specified requirements are met.

3.03 CLEANING & ADJUSTING

- A. Cleaning: Upon completion of installation, inspect furnaces and associated components. Remove paint splatters and other spots, dirt and debris. Touch up scratches and mars of finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.
- B. Adjusting: Make control, burner and other adjustments for optimum heating performance and efficiency. Adjust heat distribution features, including shutters, dampers, and relays to provide optimum heating performance and system efficiency.

3.04 DEMONSTRATION

- A. Training: Arrange and pay for the services of a factory-authorized service representative to demonstrate adjustment, operation and maintenance of furnaces and to train Owner's personnel.
- B. Conduct a minimum of 2 hours of training as specified under "Instructions to Owner's Employees" in the "Project Closeout" Section of these specifications.
- C. Schedule training with at least seven days' advance notification.

END OF SECTION

SECTION 23 55 00 - FUEL-FIRED HEATERS**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 05 29 - Hangers & Supports for HVAC Piping & Equipment
- C. 23 05 93 - Testing, Adjusting & Balancing for HVAC Piping & Equipment
- D. 23 11 00 - Natural Gas Systems

1.02 SCOPE OF WORK

- A. Install fuel-fired heater work required by this Section is indicated on drawings and schedules and by requirements of this Section.
- B. Types of fuel-fired heaters specified in this Section include the following:
 - 1. Gas-fired, separated combustion unit heaters, high efficiency.
- C. Refer to appropriate Division 23 sections for fuel piping; controls; ductwork; and testing, adjusting and balancing in connection with fuel-fired heaters; not work of this Section.
- D. Refer to Division 24 sections for the following; not work of this Section.
 - 1. Power supply wiring from power source to power connection on fuel-fired heaters. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory installed, by manufacturer.
 - 2. Interlock wiring between fuel-fired heaters and between fuel-fired heaters and field-installed control devices.
 - 3. Interlock wiring specified as factory installed is work of this Section.
- E. Provide the following electrical work as work of this Section, complying with requirements of Division 24 sections:
 - 1. Control wiring between field-installed controls, indicating devices, and heater control panels.
 - a. Control wiring specified as work of Division 23 Section "Automatic Temperature Controls" is work of this Section.
- F. Refer to other Division 23 sections for automatic temperature controls not factory installed, required in conjunction with fuel-fired units; not work of this Section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of fuel-fired heaters, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Codes and Standards:
 - 1. ANSI Compliance: Construct and install gas-fired duct heaters in accordance with ANSI Z83.9 "Gas-Fired Duct Furnaces."

2. NFPA Compliance: Install fuel gas piping and gas-fired heaters in accordance with NFPA 54 "National Fuel Gas Code."

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, weights, furnished specialties and accessories; and installation and startup instructions.
- B. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, weight loadings, required clearances, and methods of assembly of components.
- C. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring for fuel-fired heaters. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- D. Maintenance Data: Submit maintenance data and parts lists for each type of fuel-fired heater, control, and accessory; including "troubleshooting" maintenance guide. Include this data and product data in maintenance manual; in accordance with requirements of Division 01.

1.05 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Handle fuel-fired heaters and components carefully to prevent damage, breaking, denting, and scoring. Do not install damaged fuel-fired heaters or components; replace with new.
- B. Store fuel-fired heaters and components in clean, dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.
- C. Comply with manufacturer's rigging and installation instructions for unloading fuel-fired heaters, and moving them to final location.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Reznor,
- B. Others Approved per Addendum

2.02 GAS-FIRED, SEPARATED COMBUSTION UNIT HEATERS

- A. Provide gas-fired, separated combustion unit heaters as indicated, of type and minimum capacity as scheduled, and as specified herein.
- B. Provide unit with stainless steel heat exchanger and duct collars for flue and combustion air inlet.
- C. Provide the following features:
 1. 120/1/60 supply voltage.
 2. 120V to 24V control transformer.
 3. Integrated circuit board with diagnostic indicator lights.
 4. Multi-try direct ignition with timed lockout.
 5. Fan relay.
 6. Single-stage gas valve.
 7. Vibration/noise isolated fan and venter motors.
 8. Sealed control compartment.
 9. Disconnect switch.

10. External terminal strip.
 11. Sealed junction box.
 12. Door panel with safety switch.
 13. Fan guard.
- D. Provide terminal vent assembly consisting of exhaust and inlet with factory concentric adapter.
- E. Route condensate lines (2 thus connections per unit heater) as shown on plan. Route condensate with Schedule 40 PVC material fully supported with no "sags" and continual pitch back to drain point. Air gap at termination point, service sink in Parking Bay 100.
- F. Provide units that are certified to be in conformance with CSA applicable regulations.
- G. Provide the following accessories:
1. 409 stainless steel heat exchanger (primary).
 2. Thermostat, 7-day programmable.
 3. Vertical combustion air/vent kit including concentric adaptor.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which fuel-fired heaters are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF GAS-FIRED, SEPARATE COMBUSTION DUCT HEATERS

- A. Install gas-fired, separated combustion heaters as indicated and in accordance with manufacturer's published installation instructions.
- B. Hang units from substrate using threaded rods and building attachments, secure rods to unit hanger attachments. Adjust hangers so unit is plumb and level.
- C. Extend gas piping to within 5' from unit, provide drop with manual gas shutoff valve, 1/8" NPT plugged test connection, tee, and dirt pocket. Locate piping drop so as not to interfere with service of unit. Extend gas piping runout, full size of gas train inlet, from tee to gas train connection, provide union with sufficient clearance for unit removal and service.
- D. Connection of gas piping is specified in Division 23 "Natural Gas Systems" Section; not work of this Section.
- E. Extend power wiring from fused disconnect to electrical junction box on unit. Install thermostat in indicated location, provide low voltage wiring from thermostat to electrical junction box on unit. Comply with requirements of Division 24 for wiring.
- F. Electrical wiring is specified in Division 24; not work of this Section.
- G. Install terminal vent assembly at indicated location; patch, modify, repair roof as required.

3.03 STARTUP

- A. Start up, test, and adjust fuel-fired heaters in accordance with manufacturer's published startup instructions. Adjust air diffusion louvers for proper air flow. Verify proper line and manifold gas pressure. Check and calibrate controls, adjust burner for maximum efficiency.

END OF SECTION

SECTION 23 73 39 - DIRECT-FIRED GAS MAKE-UP AIR HANDLING UNIT**PART 1 - GENERAL****1.01 RELATED SECTIONS**

- A. 23 05 01 - General Mechanical Requirements
- B. 23 11 00 - Natural Gas Systems

1.02 SCOPE OF WORK

- A. Install of direct-fired weatherproof gas make-up air handling unit work required by this Section is indicated on drawings and schedules and by requirements of this Section.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of direct-fired weatherproof gas make-up air handling unit, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Regulatory Requirements:
 - 1. UL Compliance: Provide direct-fired weatherproof gas make-up air handling units which are designed, manufactured and tested in accordance with UL requirements.
 - 2. AGA Compliance: Provide direct gas-fired heater built in conformance to NFPA-54 and ETL/AGA design certified and provide AGA label.
 - 3. Provide direct gas-fired heating equipment that does not exceed contaminant threshold limits for safe environment as established by OSHA and/or ACGIH.

1.04 SUBMITTAL

- A. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, weights, furnished specialties and accessories; and installation and startup instructions.
- B. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, weight loadings, required clearances and methods of assembly of components.
- C. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring for rooftop heating and cooling units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
- D. Maintenance Data: Submit maintenance data and parts lists for each rooftop heating and cooling unit, control and accessory; including "troubleshooting" maintenance guide. Include this data and product data in maintenance manual; in accordance with requirements of Division 01.

1.05 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Handle direct-fired weatherproof gas make-up air handling units and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged rooftop heating units or components; replace with new.
- B. Store direct-fired weatherproof gas make-up air handling units and components in clean, dry place. Protect from weather, dirt, fumes, water, construction debris and physical damage.

- C. Comply with manufacturer's rigging and installation instructions for unloading direct-fired weatherproof gas make-up air handling units and moving them to final location.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Air Handling Units -
 - 1. AbsolutAire, Captive Aire, Greenheck or prior approved equal.

2.02 DIRECT-FIRED WEATHERPROOF GAS MAKE-UP AIR HANDLING UNIT

- A. Furnish and install direct-fired weatherproof gas make-up air heaters as indicated on drawings and scheduled for capacities; vertical orientation, 100% outside air constant volume.
- B. Unit shall be factory assembled and shipped as a complete packaged assembly for grade mounting, consisting of the following:
 - 1. Direct gas-fired burner.
 - 2. Direct-drive plenum fan.
 - 3. Controls, Forge LC-1 with connection to BMS.
 - 4. 12" high curb.
- C. Provide self-contained packaged heaters that shall include the casing, modulating burner, non-overloading fan, fan motor and drives, and automatic controls.
- D. Provide a casing, which shall be a minimum 18-gauge, aluminized steel, welded to structural steel framing. Both interior and exterior structural steel shall be red or gray oxide primed. All exterior casing seams shall be weather resistant. All interior and exterior surfaces will be cleaned of all oil and grease. Painted exterior will consist of a high-quality prime coat and a finish coat of machine enamel with rust inhibitors. Color is selected by the Owner and custom matched by the equipment manufacturer. Aluminized interior paneling is separated from the exterior shell by a 1" thick 1.5# density neoprene-coated fiberglass insulation. The insulation shall comply with UL Standard 181 for erosion and NFPA 90A for fire resistance. All exposed edges will be coated to eliminate erosion. Fiberglass will be held in place with both adhesive and welded pins, per SMACNA standards. Provide a minimum of (2) hinged access doors with positive latching, watertight handles. All access doors shall be painted on the interior as well as the exterior, and hinged access doors shall include braces that lock in the open position during servicing.
- E. Burner shall be a direct-fired type gas burner which shall be Midco Model HMA2, or prior approved equal, specifically designed to burn natural or propane gas below the maximum non-contaminating levels required by ANSI. Burner shall have non-clogging, stainless steel baffles attached to a cast aluminum gas supply section with no moving parts. The burner shall be capable of a 30-to-1 turndown ratio and be designed for 100% thermal efficiency for the life of the equipment. The outdoor air velocity across the burner shall be constant and at an air velocity required for ANSI certification. The burner air velocity shall be constant at all times throughout the operation of the heater. No air from the indoor space shall be allowed to recirculate across the burner at any time. Service of and access to the burner igniter and flame rod shall be accomplished through an access door or panel.
- F. Burner Profile Adjustment System shall consist of a means to monitor and adjust the pressure differential across the burner profile while the fan is running. The burner profile will remain fixed while in service and use.
- G. Pilot: The direct-fired burner will include a direct spark ignition system, including an ignition

module, spark igniter, and frame rod to verify burner low fire (pilot) ignition before allowing the main gas valve to fully open.

- H. Supply Fan shall be a double-width, double-inlet, centrifugal design, belt drive for the required air capacity. The motor shall be 1750 rpm, standard NEMA frame, open drip proof (ODP)/totally enclosed fan cooled (TEFC)/EPACT compliant/Premium Efficient mounted on an adjustable pivot base. The motor shall have a 1.15 service factor, suitable for continuous service at 120°F ambient temperature, and shall be wired for the specified voltage. The fan, motor and drive shall be factory tested to ensure the specified air delivery (per ANSI standards) at the design total static pressure. The fan shaft shall be connected to the motor by a V-belt drive, capacity designed for 30% over the motor nameplate horsepower. The fan shaft shall be a turned, ground and polished solid shaft. A protective coating shall be applied to the shaft to minimize oxidation. Fan shall have ball bearings, and shall be designed for a minimum L10 life of 100,000 hours.
- I. Controls:
- a. Main Control Panel shall meet NEMA 1, 2, 3, 3R, 3S, 4, 5, and 12 requirements and contain all standard electrical components, such as (non) fused disconnect switch; motor starter; 120-volt and 24-volt transformers; control circuit fuses; flame control relay and a number-coded terminal strip. The control panel shall have a burner flame safety circuit and components to lockout the burner flame in abnormal conditions. A remote flame reset button or switch shall allow personnel to reset the burner at the remote control panel. The complete control and safety system as well as the burner and gas manifold shall be factory tested before shipment and evidence of the factory startup provided with the O&M manual.
 - b. Temperature Controls:
 - 1) Discharge Temperature Control: A solid state temperature control system, located inside the control panel includes a sensing thermistor located in the supply fan discharge opening. The thermistor senses and controls discharge temperature. The temperature control for adjusting the discharge air temperature is located on the main unit or remote panel.
 - c. Remote Control Panel shall meet NEMA 1, 2, 5 requirements and shall be provided and includes all necessary remote operating switches and circuit analyzer lights. The remote control panel shall be painted mild steel. Wiring to remote panel from the main control panel shall be accomplished with 120/1/60 and/or 24-volt wiring circuits.

The remote control panel shall provide each heater with the following (choose):

- 1) A manual pressure-control potentiometer,
- 2) An occupied room temperature stat (the stat room sensor shall be remote mounted where noted on the plan),
- 3) A room-temperature unoccupied cycle stat (the stat sensor remote shall be mounted where noted on the plan),
- 4) A programmable 7-day timeclock with a minimum of four (4) programmable on/off schedules per day, with battery backup reserve,
- 5) A burner alarm horn with silence switch,
- 6) Summer/Off/Winter switch,
- 7) Remote burner-flame reset switch,
- 8) Manual/Auto building pressure selector switch, and
- 9) These system circuit analyzer lights:
 - a) Power On
 - b) Fan On
 - c) Burner On
 - d) Low Temperature Alarm

- d. Low-Temperature Limit Switch: Turns the fan motor off when cold air is being discharged from the heater. The minimum discharge temperature may be selected from 0 to 70°F (factory set at 40°F). An integral timer shall bypass this switch for five (5) minutes on initial startup.
- e. High-Temperature Limit Switch: Turns the burner off when the discharge air temperature exceeds 130°F (field adjustable). The switch must then be manually reset at the heater.
- f. Gas Manifold shall be sized for the rated BTU (MBH) capacity as scheduled on the drawings. The gas manifold will be constructed in conformance to ANSI Standards and Factory Mutual global (FMG).Industrial Risk Insurers (IRI) insurance requirements.

2.03 ACCESSORIES

- A. High and Low Gas Pressure Switches: This option includes a high-gas-pressure switch located on the burner end of the gas manifold and shall turn the burner off when the gas pressure is too high. The maximum gas-pressure range will be from 3" to 21" W.C. This is factory set at 1.5" W.C. above the high fire gas pressure. Also included with this option is a low gas-pressure switch located at the inlet of the gas manifold. The low gas switch shall turn the burner off when the gas pressure is too low. The minimum gas pressure range will be from 3" to 21" W.C. This switch shall be factory set at 3.0" W.C.
- B. Inlet Hood with Bird Screen: Manufactured using the same gauge and metal type as the base unit and includes 1/2" x 1/2" galvanized bird screen.
- C. Side Access Filter Section: Manufactured using the same gauge and metal type as the base unit and is field attached at the unit inlet (entering air) end. All interior surfaces will be lined with 1" thick, 1-1/2# density, coated fiberglass when specified. The insulation shall comply with UL Standard 181 for erosion and NFPA 90A for fire resistance. All exposed edges will be coated to eliminate erosion. Fiberglass will be held in place with both adhesive and welded pins, per SMACNA standards. Filters are to be 2" 30% pleated/disposable. Provide a clogged filter warning (light/alarm/photohelic gauge) at the main (remote) control panel. Filters are UL Class 2.
- D. Vibration Isolators shall consist of a steel housing and an R-I-S (rubber in shear) isolation element, molded entirely of a colored oil-resistant neoprene stock for easy identification of capacity. The isolators shall have a deflection of 1/4" or less and will be supplied by the heater manufacturer.
- E. Discharge Diffuser shall be provided and will include horizontal and vertical blades. The diffuser will be constructed such that it discharges supply air in 3 directions and will be constructed of a minimum of 16-gauge aluminized steel. The directional blades will be 14-gauge aluminized steel and will be field adjustable and are able to be locked into place.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which direct-fired weatherproof gas make-up air handling units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION OF DIRECT-FIRED WEATHERPROOF GAS MAKE-UP AIR HANDLING UNITS

- A. Install direct-fired weatherproof gas make-up air handling units where indicated, in accordance with equipment manufacturer's published installation instructions, and with recognized industry practices to ensure that units comply with requirements and serve intended purposes.

- B. Coordination: Coordinate with other work, including ductwork, grading and piping, as necessary to interface installation of direct-fired weatherproof gas make-up air handling units with other work.
- C. Access: Provide access space around direct-fired weatherproof gas make-up air handling units for service as indicated, but in no case less than that recommended by manufacturer.
- D. Mounting: Mount direct-fired weatherproof gas make-up air handling units on vibration isolators in accordance with manufacturer's instructions.
- E. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
 - 1. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 24 sections. Do not proceed with equipment startup until wiring installation is acceptable to equipment installer.
- F. Piping Connections: Refer to Division 23 HVAC sections. Provide piping, valves, accessories, gages, supports and flexible connectors as indicated.
- G. Duct Connections: Refer to Division 23 Air Outlets and Inlets. Provide ductwork, accessories and flexible connections as indicated.
- H. Grounding: Provide positive equipment ground for air handling unit components.

3.03 FIELD QUALITY CONTROL

- A. Testing: Upon completion of installation of air handling units, start up and operate equipment to demonstrate capability and compliance with requirements. Field correct malfunctioning units, then retest to demonstrate compliance.

3.04 EXTRA STOCK

- A. Provide one complete extra set of filters for each air handling unit. Install new filters at completion of air handling system work and prior to testing, adjusting and balancing work. Obtain receipt from Owner that new filters have been installed.

END OF SECTION

SECTION 26 05 00 - BASIC MATERIALS & METHODS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.

1.02 DRAWINGS & SPECIFICATIONS

- A. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown on or mentioned in both. In case of any discrepancy in drawings or specifications, the matter shall immediately be submitted to the Architect/Engineer, without whose decision said discrepancy shall not be adjusted by the Contractor except at his own risk. Scale of drawings shall be field verified by Contractor.
- B. The Contractor shall consult the Architectural Drawings for all dimensions, furred spaces, suspended ceilings, etc. The Contractor shall also check the Architectural Drawings verifying the heights of cabinets and counters to place wall outlets over this equipment at the proper heights; location of closets, doors and window frames which may interfere. Particular attention shall also be given to the height and location of convectors and radiators. The Contractor shall check with other trades for interference and shall cooperate to avoid such interferences.
- C. The Contractor shall verify all rough-in locations and requirements with equipment supplier shop drawings prior to installation.

1.03 MANUALS, PARTS LISTS & INSTRUCTIONS

- A. Each Contractor shall furnish and turn over to the Engineer two (2) complete sets of manufacturer's instruction manuals. Manuals shall, in addition to one copy of each approved shop drawing, include operation and maintenance instructions for such items of equipment furnished, including assembly drawings and parts lists. Parts lists shall include identification symbols or parts numbers for all replaceable parts and assemblies. The list shall also include the name and address of the nearest supply house carrying spare parts for the equipment. These materials shall be bound in hard covers. Upon approval, these instructions will be turned over to the Owner. The Contractor shall also supervise the initial operation of all equipment and instruct an operator selected by the Owner to thoroughly acquaint him with the best operating and maintenance practice. The Contractor shall have the Owner sign off on all training.

1.04 EQUIPMENT ACCESSIBILITY

- A. The Contractor shall locate all apparatus requiring adjustments, cleaning or similar attention so that they will be readily accessible. This shall include access doors and panel of proper size for proper maintenance of various parts. Front top and side clearances to electrical equipment shall be in line with NEC.

1.05 FIRE & SAFETY PRECAUTIONS

- A. Each Contractor shall: Take all necessary precautions for safety of employees, employees of Owner and public; comply with applicable provisions of Federal, State and Local laws, ordinances and requirements; erect and properly maintain necessary safeguards for said protection as required by conditions and progress of job and shall post danger signs warning against hazards of construction. Each Contractor shall exercise extreme care to maintain and exercise adequate fire safety precautions throughout construction. Provide barriers around all excavations and openings where uncontrolled descent could cause injuries.

- B. All cutting, welding or brazing operations carried on in the vicinity of or accessible to combustible material shall be adequately protected to make certain that sparks or hot slag does not reach the combustible material and thus start a fire.
- C. Whenever combustible material has been exposed to molten metal or hot slag from welding or cutting operations, or splatter from electric-arc, a person shall be kept at the place of work for at least one hour after completion to make sure that smoldering fires have not been started.

1.06 GUARANTEES

- A. The Contractor shall assume responsibility for any defects which may develop in any part of the system caused by faulty workmanship, material or equipment and agrees to replace any such workmanship, material or equipment during a period of one year from the date of final acceptance of the work without cost to the Owner. Acceptance of the work shall not waive this guarantee.

PART 2 - PRODUCTS

2.01 PROTECTION

- A. Materials - The Contractor shall, at all times, protect the materials and equipment to be installed in such a manner that when the installation is completed it will present the same new appearance as when uncrated.
- B. This shall be achieved by covering all equipment securely with weatherproofing canvas, by keeping other trades from abusing such material and equipment and by avoiding the final setting of such equipment in location where protection is either difficult or impractical. Any material or equipment damaged as a result of inadequate handling or protection may be ordered taken out and replaced to the satisfaction of the Engineer.
- C. Guards - Provide guards to enclose belts, pulleys, sheaves, gears and couplings, of galvanized expanded or perforated sheet steel with angle frame and angle or channel mounting supports. Make guard easily removable for access. Provide galvanized pipe railing guards where required. Conform to State and Federal codes and regulations.
- D. All materials shall be new, undamaged and shall bear the UL label of approval and shall be listed for use in each specific location unless approval does not apply.
- E. Samples of materials proposed for use shall be presented to the Engineer for his approval when requested.
- F. When two or more items of the same equipment are required, they shall be of the same manufacture.

2.02 DEFECTIVE MATERIALS

- A. In the event damaged or defective material is discovered during tests or during the guarantee period, this defective or damaged material shall be replaced at the Contractor's expense. The repair of defective or damaged materials shall be at the decision of the Engineer. Neither final payments nor any provision in the contract nor whole or partial use or occupancy of the premises shall constitute the acceptance of work not done in accordance with the specifications nor relieve the Contractor of liability for faulty materials or workmanship in accordance with the specification or law.

PART 3 - EXECUTION

3.01 MANUFACTURER'S DIRECTIONS

- A. Materials and equipment shall be installed in strict accordance with the manufacturer's directions for

installation, connection and startup of factory-assembled units and/or composite parts assembled into a system unless specifically designated herein.

3.02 EXISTING CONDITIONS & SERVICE INTERRUPTIONS

- A. When encountered in work, protect, brace, support, existing active services including, but not restricted to sewers, gas, electric and other systems where required for proper execution of work. If existing active services are encountered that required relocation, make request in writing for determination. Do not proceed with work until written directions are received. Do not prevent or disturb operation of active services that are to remain.
- B. When encountered in work, remove, cap or plug inactive services. Notify utility companies or municipal agencies having jurisdiction; protect or remove these services which will be shut down only during the time actually required to make necessary connections to existing work.
- C. Where work makes temporary shutdown of services unavoidable, shut down at night, or at such times as approved by Owner, which will cause least interference with established operating routine. Arrange to work continuously, including overtime, if required, to assure that services will be shut down only during the time actually required to make connections to existing work.

3.03 TESTS, INSPECTIONS & ADJUSTMENTS

- A. Furnish all items and labor necessary for tests required in this Division. The Contractor shall notify the Engineer a reasonable period ahead of time before the tests are to be made. Concealed work shall remain uncovered until required tests have been completed; but, if necessary, tests on portions of the work may be made and these portions covered up after proving satisfactory. Tests shall be repeated after defects have been eliminated.
- B. Tests will be as prescribed by Local, State or National codes insofar as they apply. Where inspections are made by an enforcing agency, a copy of the Certificate of Compliance of Acceptance shall be forwarded to the Engineer before the final inspection will be made. Tests shall be made at the Contractor's expense. Each portion of work shall be subject to inspection of the Engineer at times he deems necessary for inspection of materials and construction and shall give instructions as he may consider requisite.
- C. Workmanship, materials or equipment, either at the site or intended for it, are subject to inspection and approval of Engineer at any time. Contractor must render such facilities as Engineer requires for inspection whatever they may be. Engineer may reject and require removal from premises any materials or work which he may decide to be contrary to the contract. The Engineer shall have the right to make minor changes as may be considered necessary by job conditions, where no change in cost is involved.
- D. At the time of final inspection of the work under the contract, the work covered by this division shall be complete in every respect and in perfect operating condition. All surplus materials of every kind shall have been removed.
- E. After final inspection is made, the Contractor shall receive a list of items requiring adjustment, correction, replacement or completion. The Contractor shall comply completely with all the listed requirements.
- F. Test for opens, ground and shorts of feeders and branch circuits at time of construction. All equipment shall be left in first-class operating condition. All outlets, switches, light fixtures and devices shall be in first-class working order. Motors shall be tested for rotation at time of connections.
- G. All factory-assembled equipment shall be checked when being installed for loose, missing or broken parts. Any items found loose shall be tightened and items found broken or missing shall be replaced all at no expense to the Owner. Contractor shall obtain and pay for certification by State Electrical

Inspector.

- H. Provide training to all Owner personnel on all basic electrical systems. Training shall include review of all installed systems, walk-through of systems, location of main electrical panels and panelboards, and all control panels.
- I. The Contractor shall furnish all instruments, labor, communication devices and expertise needed for conducting and recording tests.
- J. The Engineer may require a factory-trained representative to be on site at final walk-thru and training. The Engineer may require a factory-trained representative to be on site twice during the warranty period.

3.04 CUTTING & PATCHING

- A. Each Contractor shall perform all cutting necessary to perform his work and shall patch damaged work. However, special permission shall be obtained from the Architect before cutting structural members or finished materials. All patching shall be performed in such a manner as to leave no visible trace and to return the part affected to the condition of undisturbed work. All conduit holes shall be core drilled in existing construction.

3.05 STREET, SIDEWALK & CURB REPAIR

- A. Each Contractor will be responsible for the replacement of existing street pavement, curbs, sidewalks, etc., removed by him or damaged by him in the course of the work. Pavement repairs shall be done as required by the Owner, State or City; and the Contractor shall make the necessary arrangements to perform such repairs and shall pay all costs in connection with same unless such work is to be reconstructed under the General Contract.

3.06 ROOF CURBS & FLASHINGS

- A. The Roofing Contractor will provide roof curbs and do all flashing for pipes, ducts and conduits at the time the roofing material is installed providing conduit is in place at time of roofing, otherwise flashing will be responsibility of the Contractor.

3.07 PAINTING

- A. Unless otherwise specified, all finished painting will be done by the Painting Contractor. The Contractor shall provide preservation and prime coats. This Contractor shall paint all hangers, straps, braces, supports and equipment requiring same installed by him immediately after installation with Rustoleum paint or equal. If equipment furnished by the Contractor has started to rust or is painted, equipment shall be repainted to the satisfaction of the Engineer.

3.08 CLEANING

- A. Upon completion of work, all rubbish must be cleared away; all fixtures, panels, hangers and trim, etc., shall be thoroughly cleaned and ready for use. All fingermarks around access doors and outlet openings shall be cleaned or repainted if the marks cannot be removed by cleaning.

3.09 CORE DRILLING WALLS/FLOORS

- A. Contractor shall provide all holes thru walls, floors and ceilings of existing construction necessary for the installation of new conduits. All holes shall be core drilled and of sufficient size to allow the conduit to pass thru the opening.
- B. All conduit passing thru these openings shall be sized for a snug fit around the conduit, or the openings are to be reduced by using grout or other cement type closing materials approved by the Engineer. The

grout shall be troweled smooth on both sides of the wall and primed for painting.

- C. Firestopping - See Firestopping Specifications Section 07 84 00.

3.10 "PROVIDE"

- A. "Provide" means to furnish and install.

END OF SECTION

SECTION 26 05 01 - GENERAL PROVISIONS - ELECTRICAL**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the General Provisions of Division 01 apply to all work of this Section.
- B. The work to be done under this specification includes the furnishing of all labor, materials, equipment and services necessary for the proper completion of all electrical work. Refer to "INDEX SHEET" of Divisions 26, 27 and 28 for the work included.
- C. The omission of express reference to any parts necessary for or reasonably incidental to the complete installation shall not be construed as releasing the Contractor from furnishing such parts.

1.02 PERMITS, LICENSES & FEES

- A. The Contractor shall obtain and pay for all permits, notices, inspection fees, licenses, etc., necessary for the performance to the work included in this contract, including plan review costs; and he shall observe any requirements stipulated thereon.

1.03 CODES, REGULATIONS & STANDARDS

- A. All work under this division shall be in strict conformance with the applicable parts of the following codes, laws, rules, regulations and applicable standards of technical societies where referenced herein-after. References to standards, codes, regulations, etc., shall mean the latest edition of such publications adopted and published at date of the invitation to submit proposals.

National Electric Code (NEC)
 Regulations of the State Department of Health
 Regulations of the State Industrial Commission
 Rules of the National Board of Fire Underwriters
 Local Codes, Rules and Regulations
 Occupational Safety and Health Act (OSHA)
 State Building Code Division
 Local Electric Utility
 American Disabilities Act (ADA)
 Minnesota Building Codes:
 1300 Building Code
 1302 Construction Approvals
 1303 Minnesota Provisions
 1305 Adoption of IBC
 1306 Special Fire Protection
 1307 Elevators & Related Devices
 1311 Rehabilitation of Existing Buildings
 1315 Electrical Code
 1341 Accessibility Code
 1346 Mechanical Code
 1365 Snow Loads
 4715 Plumbing Code
 1323 Commercial Energy Code

1.04 REFERENCES

- A. References to standards, codes, specifications, recommendations shall mean the latest edition of such publications adopted and published at date of invitation to submit proposals. Reference to technical societies, trade organizations, governmental agencies is made in mechanical and electrical work sections

in accordance with the following abbreviations:

AGA	American Gas Association
AIEE	American Institute of Electrical Engineers
ANSI	American National Standards Institute
ASHARE	American Society of Heating and Air Conditioning Refrigerating Engineers
ASTM	American Society for Testing Materials
CSD	Commodity Standards Division, US Department of Commerce
NAFM	National Association of Fan Manufacturers
NBFU	National Board of Fire Underwriters
NEC	National Electric Code
NEMA	National Electrical Manufacturers' Association
UL	Underwriters' Laboratories, Inc.

1.05 CONTRACTOR'S QUALIFICATIONS

- A. This Contractor shall be a licensed Class "A" Electrical Contractor in the State. All work shall be installed and completed by electricians skilled in their trade and shall be installed in a practical and workmanlike manner.

1.06 INSPECTION OF THE SITE

- A. The Contractor is urged to examine the site and familiarize himself with existing conditions on the premises and surrounding area. No extras will be authorized because of the Contractor's misunderstanding as to extra work required in order to comply with these plans and specifications, or his lack of knowledge of conditions in connection with the work. Information received by the Contractor from verbal conversations shall not be construed as relieving the Contractor from actually visiting the site and making his own analysis of conditions.

1.07 SHOP SUBMITTALS

- A. This Contractor shall submit for approval at least six (6) copies of shop drawings to the Engineer at least six (6) weeks in advance of ordering date. Shop drawings will be returned without consideration if the following are not included before submittal:
 - 1. A check by this Contractor for space conformance and performance characteristics.
 - 2. Contractor's stamp or signature.
 - 3. Identify each item by equipment number (from the drawings) or, in absence of an equipment number, identify by specification section.
 - 4. Check or underline specific model to be submitted on catalog sheets containing several models.
- B. The Engineer's approval of the shop drawings is general and does not relieve the Contractor from the responsibility for adherence to the specifications, nor shall it relieve him of the responsibility for any error which may exist.
- C. Dimensions and quantities are the responsibility of the Contractor. Submit shop drawings on equipment listed on the equipment schedule of the drawings and the following pertinent to this project:
 - Lighting Fixtures
 - Wiring Devices
- D. Shop drawings and O&M manuals shall be provided on a CD at the end of the project. The CD shall include the shop drawings, O&M manuals, links to the web sites of all the manufacturers and links to all of the equipment specifications and manuals.

1.08 RECORD DRAWINGS

- A. The Contractor will be provided a clean set of drawings for the purpose of recording conduit routings

(underground and concealed) and locations of equipment that deviate from the contract drawings. Additional detail of difficult routing shall be sketched on the record drawings to more clearly show routing around where interference was encountered during construction. Sufficient measurements shall also be recorded on the drawings to locate routings that have been made inaccessible by walls, floors or ceilings. Upon completion of the project, the record set of drawings will be reviewed with the Engineer before delivering to the Owner.

- B. Record Drawings - The Contractor shall update the CAD files of all changes made during construction and provide these files to the Engineer for approval before turning over to the Owner.

1.09 ABBREVIATIONS

- A. Following is a key to abbreviations used in mechanical and electrical work sections:

a-c	alternating current	Ht	total heat gain
AFF	above finish floor	ID	inside diameter
AFG	above finish grade	in or "	inch
amp	ampere	ips	intermediate-pressure
atm	atmosphere	ips	iron pipe size
boiler hp	boiler horsepower	kw	kilowatt
bhp	brake horsepower	kw/hr	kilowatt/hour
BTU	British thermal unit	lb	pound
BTUH	BTU per hour	lin ft/LF	linear foot
C	degree Centigrade	max	maximum
cfm	cubic feet/minute	M&E	Mechanical & Electrical
c.i.	cast iron	M&ER	M&E Requirements
c-p	chrome-plated	MBH	thousand BTU/hour
cu in	cubic inch	MCF	1000 cubic feet
cu ft/CF	cubic feet	min	minimum
cu yd	cubic yard	m-p	medium-pressure
db	decibel	o.a.	outside air
d-c	direct-current	o.c.	center to center or on centers
deg	degree	od / OD	outside diameter
dia	diameter	os&y	outside screw and yoke
dif	diffuser	oz	ounce
edr / EDR	equivalent direction radiation	prv	pressure reducing valve
exh	exhaust	psi	pounds/square inch
F	degree Fahrenheit	PVC	Polyvinyl Chloride
FBO	furnished by others	R.A.	return air
FD	Fire Department	RAG	return air grille
FD	floor drain	reg	register
fpm	feet/minute	rpm	revolutions/minute
F & T	float & thermostatic	sec	second
ft or '	foot	sq ft	square foot
gal	gallon	sq in	square inch
gph	gallons/hour	sp	static pressure
gpm	gallons/minute	swp	steam working pressure
Hg	mercury	std	standard
h-p	high-pressure	tdh	total dynamic head
hp	horsepower	temp	temperature
Hs	sensible heat gain	wwp	water working pressure
hr	hour	XFMR	transformer

1.10 STARTER CODE

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STARTER CODE

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	A = MAGNETIC STARTER WITH OVERLOADS
1ST DIGIT	B = MANUAL STARTER WITH OVERLOADS
	C = TWO SPEED MAGNETIC STARTER
	D = ELECTRONIC SOFT START
=====	
2ND DIGIT	NO. OF POLES
=====	
3RD DIGIT	NEMA STARTER SIZE
=====	
4TH DIGIT	QUANTITY OF AUX. INTERLOCKS
=====	
	A = STOP - START IN COVER
	B = SELECTOR SWITCH IN COVER "OFF-HIGH-LOW"
5TH DIGIT	C = SELECTOR SWITCH IN COVER "HAND-OFF-AUTO"
	D = PILOT LIGHT IN COVER
=====	

NOTES

1. LOCATE STARTERS ON WALL AT 5'0" UP.
2. LOCATE MAGNETIC STARTERS IN ACCESSIBLE LOCATION FOR SERVICING.
3. THERMOSTATS FURNISHED BY OTHERS UNLESS OTHERWISE SHOWN.
4. ROOF VENTILATOR DISCONNECTS PROVIDED UNDER HOOD WITH FAN.

PART 2 - PRODUCTS

2.01 SUBSTITUTE MATERIALS & EQUIPMENT

- A. Contractor requests for materials and equipment in addition to that specified and not followed by "or equal" shall be considered substitution. Substitute materials and equipment will not be considered unless prior approval has been given by the Engineer. If such approvals are not requested, it shall be assumed materials and equipment specified will be furnished and no further substitution after the bid date will be accepted.
- B. "Or Equal Clause" - It shall be the sole responsibility of the Engineer to determine if materials, methods or procedures are "equal" to that which is specified. All such changes made without such authorization are subject to correction at no additional cost to the Owner. The "Or Equal Clause" in the General Conditions of this specification is not intended to allow the Contractor to redesign the system as specified. The Clause is also not intended to reduce the number of component parts as specified and as shown on the drawings.
- C. Request by the Contractor to use substitute equipment, methods or materials received at the Engineer's office will be considered only if received at least 7 calendar days prior to the Bid Opening date. Requests shall refer specifically to equipment number and/or specification section, and shall include data and drawings to allow the Engineer to compare the request for substitution. If approved, substitution will appear in addendum form. If a personal reply is desired, enclose a stamped, self-addressed envelope.
- D. Contractor shall be completely responsible for costs involved in equipment other than specified model number as to sizes, layout, interference with other equipment, access to appurtenances, changes in other appurtenances and additional work required because of this equipment change.

- E. Equipment called out as "No Substitution" shall be supplied as specified.

2.02 SALVAGE MATERIALS

- A. All materials removed by this Contractor shall be reviewed by the Owner. Materials not wanted by the Owner shall become the property of this Contractor and shall be removed by him from the premises. Material the Owner wants to keep shall be stored by him.

2.03 EXISTING WIRING & EQUIPMENT

- A. The Contractor shall disconnect all electrical power and controls of existing equipment in the existing building to be relocated. The Contractor shall connect electrical power to all new and relocated Owner's equipment. Existing conduits may be used wherever possible. Wiring to be abandoned shall be disconnected from the power source. In existing walls being removed, the downstream devices to remain shall have new wiring permanently installed for circuit continuity. Electrical Contractor shall disconnect and remove all existing electrical devices and wiring.
- B. Equipment Removal - This Contractor shall disconnect and remove existing light fixtures, electrical equipment, wiring, as indicated on the drawings or required to complete the work and blank off all boxes that are not to be reused. Concealed work not to be reused may be abandoned if disconnected from the electrical system and labeled for future use.

PART 3 - EXECUTION

3.01 EQUIPMENT CONNECTIONS

- A. Unless otherwise specified, each contractor shall make all connections of his trade to all installed equipment whether provided by himself or by other contractors. Each contractor shall leave proper connections for equipment furnished by them including flanges, etc. Connections size shall be as indicated but not smaller than equipment.
- B. Plumbing - All domestic water, waste, vent and soil connections, including traps and fixture shutoffs, shall be made by the Plumbing Contractor.
- C. Steam, Condensate and Heating Water - All steam, condensate and hot water connections, including equipment, unions, traps and shutoffs, shall be made by the Heating Contractor.
- D. Electrical - Unless otherwise specified, the Electrical Contractor shall:
1. Perform all electric power wiring and make all electric power connections to all electrical equipment shown on the Electrical Drawings.
 2. Provide and install all starters, disconnects and overload protection. See motor and equipment schedule.
 3. Provide and install all control wiring shown only on the electrical drawings. Other control wiring shall be by the Contractor requiring the same.
- E. All Trades -
1. Furnish and set all motors required for their equipment.
 2. Submit a complete list and wiring diagrams to the Electrical Contractor and the Architect of all equipment showing the electrical characteristics.

3.02 COORDINATION OF WORK

- A. This Contractor shall coordinate the installation of all electrical equipment and appurtenances required for this project with other contractors to eliminate interferences. Installation shall be as shown on the plans unless the coordination between contractors require minor deviations. These adjustments shall be made at no cost to the Owner. The Engineer shall be kept informed of all such deviations.

- B. Work or Supplies by Others - "Others" includes other contractors or persons outside the specified scope of Electrical Contractor or Electrical Subcontractors; such as General Contractor, Mechanical Contractor or Owner.

3.03 FINAL INSPECTION

- A. When the project is complete and prior to acceptance by the Owner, a final inspection will be held. Before final inspection is made, the work shall be complete in accordance with plans and specifications.
- B. When the Owner is notified in writing that the work is complete, including the items noted on final inspection, a follow-up inspection will be made. The Contractor shall recognize the need for proper procedure and diligence for completing work on time, including prompt attention to finishing and follow-up work.
- C. Final payments will not be made until all corrective work and incomplete work has been properly finished. Additional corrective work found after the date of final payment will be subject to the provision of guarantees. No reduction in retained percentage will be considered until:
 - 1. The project is completed.
 - 2. Final inspection has been made.
 - 3. Corrective items and deficiencies noted on final inspection complete and finished as far as may be possible within the Contractor's control.
 - 4. Approval received from the Surety.
 - 5. Lien Waivers filed.

3.04 INSTRUCTION OF OWNER'S EMPLOYEES

- A. Provide services of competent instructors, who will give full instructions in the care, adjustment and operation of all parts of the electrical system and equipment to the Owner's employees who are to have charge of the equipment.
- B. Each instructor shall be thoroughly familiar with all parts of the installation on which he is to give instructions and shall have full knowledge of the operating theory and practical operation-maintenance work. Factory-trained instructors shall be employed whenever they are available.
- C. Instructions shall be given during the regular work week after the building has been accepted and turned over to the Owner for regular operation. Provide a minimum of one man-week (40 hours) of instructions for electrical equipment and lighting. See individual sections for additional training of special systems.
- D. Document all instruction material, and submit prior to the commencement of training sessions and include with Operation and Maintenance Manuals.
- E. Provide detailed cost breakout of instruction and instructional materials. This breakout shall distinguish between each system and equipment.

3.05 CLEANING

- A. The interior and exterior surfaces of electrical equipment enclosures shall be wiped or cleaned with a vacuum two weeks before scheduled use and again immediately prior to final completion.
- B. Accessible elements of disconnecting and protective items shall be cleaned with a vacuum before energizing.
- C. Scratches on painted surfaces shall be touched up with paint of equivalent quality and color.

END OF SECTION

SECTION 26 05 02 - ELECTRICAL DEMOLITION**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the provisions of Division 01 apply to all work of this section.
- B. The work of this section includes all labor, material, equipment and services to do all demolition necessary to the construction for a complete job in accordance with the drawings and as specified herein.

1.02 PROTECTION

- A. Do all demolition in a careful and workmanlike manner as not to impair the strength or safety of the existing building.
- B. Existing conduit and feeders shall be temporarily supported where the existing circuit is to remain connected or be relocated.
- C. Coordinate with General Contractor and other trades during all demolition to avoid loss of services in other areas of the existing building and to prevent the spread of dust and foreign material into the occupied areas of the building.
- D. All debris must not be allowed to accumulate and shall be removed from the site immediately.

1.03 DEMOLITION

- A. Refer to all drawings for demolition areas. Visit the site before bidding to determine existing conditions. All notes are general and do not relieve the Contractor from disconnecting, removing and protecting all work required or necessary to complete the new construction.
- B. A general description of demolition items as follows:
 - 1. Lighting - Disconnect and remove all interior lighting including conduit, wiring, boxes, etc., except where existing circuits are to be reused or fixtures are to remain connected.
 - 2. Power - Disconnect and remove all wiring devices and equipment including conduit, wiring, boxes, etc., except where devices are shown to be reused and circuits to remain connected or extended. Panelboards and feeders to be disconnected shall first have the circuits verified by Electrical Contractor to determine if disconnection would create an outage on another floor. Provide temporary wiring and conduit to keep such circuits energized and connect to nearest panelboard spare breakers.

END OF SECTION

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS & CABLES**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and General Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install wires and cables where shown or indicated on the drawings and specified herein.
- C. All wire and cable shall be new, of the best quality, and of the size, type and number indicated. Conductors shall be of soft annealed copper conforming to the requirements of ASTM specifications, latest edition. Unless otherwise noted, wire shall be rated 600V. All conduits are sized based on copper conductors unless noted on the drawings. Shall be listed or labeled by "UL."
- D. Neutral wire in all cases shall be provided with an outer identification of white or gray distinguishing color and shall be the same size as the phase wires unless otherwise noted. All branch wiring shall be color coded. #12 AWG wire shall be minimum size used throughout unless otherwise indicated on the drawings. All wire #10 AWG or larger and all control wiring shall be stranded.
- E. Electrical wire, cable and connectors shall be for power distribution, lighting circuits, equipment circuits, appliance circuits and motor circuits. All wiring and connectors shall be UL listed and labeled.
- F. Cross lines on the conduit runs indicate the number of wires to be installed. Where two or more neutrals are in one conduit, each shall be individually coded or rung out for identification of the proper circuit. Aluminum conductors shall be used only where shown on the drawings.
- G. Branch Circuit Color Coding -

<u>Color (120/208 volt)</u>	<u>Phase</u>
Black	A or 1
Red	B or 2
Blue	C or 3 (where applicable)
White or Gray	Neutral
Green	Equipment Ground

PART 2 - PRODUCTS**2.01 WIRING**

- A. Wiring for branch circuits shall be THWN or THHN; 600 volt, 75°C minimum rating.
- B. Wiring pulled through wiring channels of continuous rows of fluorescent fixtures shall be THHN.
- C. Feeders shall be THWN.
- D. Type AC/MC cable shall be allowed for recessed light fixtures above a ceiling. No direct fixture-to-fixture connections are allowed.
- E. Compact aluminum conductors shall not be allowed.

2.02 CONNECTORS

- A. Joints for wiring sizes #10 and smaller shall be made with insulated, compression, spring-type connectors that exert pressure on the conductors as they are turned into the connector.

- B. #8 and larger connectors shall be solderless type lugs where the tightening screw does not bear directly on the conductor. Mechanical compression type connectors may be used if installed with a tool designed for the purpose by the manufacturer of the connector.
- C. Some of the known manufacturers are, but not limited to, as follows: Anixter, Rome, American, General, Southwire and Triangle, Appleton, Burndy, Panduit, Ideal, 3M, OZ Gedney, T&B.
- D. Mechanical compression-type connectors shall be used on all aluminum conductors. Connectors shall be used with a tool designed for the purpose by the manufacturer of the connector.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install all electric wiring as indicated on the drawings in line with NEC, latest edition. Pull all conductors simultaneously when installed in the same raceway.
- B. Install all joints and splices with equal or better mechanical and dielectric strength than the conductors being spliced.
- C. All joint connectors must be compatible with the conductors being used.

3.02 FEEDER CIRCUITS

- A. Secondary electrical distribution shall be 120/208V, 3 phase, 4W, for power, lighting and outlets. Furnish and install all feeders from panels to various loads as indicated and specified. Feeders shall be of the types and sizes indicated.

3.03 BRANCH CIRCUIT SYSTEMS

- A. Power Circuits - Branch circuits shall be installed from power distribution panels to individual outlets or control equipment as indicated on the plans. Conductors shall be of the size and type noted and installed in conduit of size indicated or required by the number of conductors involved. Each motor shall be supplied by an individual branch circuit from the power distribution center (panelboard) indicated on the plans. Circuit conductors and raceways shall be of the size and type noted on the drawings.
- B. Lighting Circuits – Branch circuit conductors for the general lighting system shall be installed in conduit from the panelboard to outlets and between outlets as indicated on the plans. No wire smaller than #12 shall be used for any lighting branch circuit. If the single distance from panelboard to first outlet exceeds 50 ft., the minimum size conductor for this run shall be #10. If, in special cases, this distance must be exceeded, larger conductors of sizes noted on the plans shall be installed.
- C. Outlets shall be as specified herein and shall be of a type approved for installation conditions encountered (flush plaster or drywall, masonry construction, concrete slab, surface-mounted boxes or conduit fittings).
- D. Receptacle Circuits – Furnish and install branch circuits to receptacle outlets as noted on the plans. Circuits shall be as indicated in specific areas. No wire smaller than #12 shall be used for any branch circuit supplying convenience outlets.
- E. For excessively long runs (50 ft. or more) from panelboard to first receptacle outlet, minimum size wire shall be #10 with conductors between outlets being #12. Receptacle circuits shall be circuit breaker controlled as indicated on the plans. Receptacles for specific areas shall be of the size and type indicated on the plans and specified herein.

END OF SECTION

SECTION 26 05 26 - GROUNDING & BONDING FOR ELECTRICAL SYSTEMS**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install all grounding as shown on the drawings and specified herein.

1.02 SYSTEM DESCRIPTION

- A. All conduit systems, switchboxes, cabinets, motor frames, switchgear, transformers and all other electrical equipment shall be solidly grounded in strict accordance with the NEC to form a continuous, permanent and effective grounding system.
- B. Grounding shall be connection to building water line if metallic. Alternate grounding as shown on the drawings are reinforcing rods in footings (minimum of 20 lin.ft. of rod). Additional grounds are grounding electrodes, ground rods, loop systems, separately derived grounds and connection to building steel.
- C. Neutrals shall be bonded to the grounding system only at the building service entrance and when establishing a separately derived system such as the secondary side of transformers.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Manufacturers offering grounding products shall be used wherever possible. All grounding products shall be UL listed and approved.

2.02 MANUFACTURERS

- A. Some of the known manufacturers of grounding products are, but not limited to, as follows: Burndy Corp., Crouse Hinds, Gould, Ideal, T&B, Blackburn, Joslyn and Cadweld.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Grounding shall be coordinated with utility, other contractors and all electrical systems requiring grounding.
- B. Where clean grounds are shown for electric equipment, the grounding conductor shall run separately to the main grounding point.
- C. Where grounding bars or grounding plates are shown, they shall be a minimum of 1/4" thick copper plate with lugs for connection of grounding conductors. They shall be provided with standoff insulators so tapped screws may pass through the grounding plate.
- D. Where grounding resistance tests are required, Contractor shall provide all labor and equipment to make the test and provide test reports to the Engineer. Generally, tests will be Fall of potential ground tests.
- E. Greenfield flexible conduit and Type UA liquid type flexible conduits shall have proper size ground conductor jumper bonded to the rigid conduit system and to the electrical equipment where the flexible

conduit is terminated.

- F. The ground lugs on all 3-wire ground type receptacles shall be securely connected to the grounding system per the NEC. Additional grounding grids, driven ground rods, etc., shall be as shown on the drawings or specified in the section requiring additional grounding. GFI protection breakers or receptacles shall be used on construction site and where shown on the drawings.

END OF SECTION

SECTION 26 05 29 - HANGERS & SUPPORTS FOR ELECTRICAL SYSTEMS**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install supporting devices where shown or indicated on the drawings and as specified herein.

1.02 SUMMARY

- A. Contractor to provide and install supporting devices for proper installation of electrical raceway systems and other equipment installed under this Division.
- B. Design and construct supporting structures of strength to safely withstand stresses to which they may be subjected and to distribute properly the load and impact over building areas. Conform to applicable technical societies standards, also to codes and regulations of State and Local agencies having jurisdiction.
- C. Equipment Supports - Supports shall be made of durable materials suitable for the application and shall be painted with two coats Rustoleum paint. Where excessively corrosive conditions exist, supports shall be protected by galvanizing or other approved suitable methods.
- D. Perforated iron or tie wires for supporting conduits will not be permitted. The required strength of the support assemblies and size and type of anchors shall be based on the combined weight of the conduit, wiring and hangers. Brackets, braces, reinforcing angles, etc., shall be installed in all partitions, ceilings, etc., not sufficient in themselves to support the electrical apparatus.
- E. Horizontal conduit runs shall be securely fastened to structure or, if suspended, shall be fastened to trapeze type hangers, which in turn shall be securely fastened. Fasteners shall extend into the structural walls and ceilings and not to the surface finish only. Horizontal runs shall be fastened at intervals as required by NEC including the last support to the outlet, junction box or fitting.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Provide supporting devices to the clevis hangers with rods, clamps, couplings, conduit straps, trapeze hangers, expansion anchors, toggle bolts and formed channels.

2.02 MANUFACTURERS

- A. Some of the known manufacturers are, but not limited to, as follows: Ackerman Johnson Fastening Systems, Inc.; Ideal Industries, Inc.; Joslyn Mfg. and Supply Co.; McGraw Edison Co.; Rawlplug Co., Inc.; Star Expansion Co.; Allied Tube and Conduit Corp.; B-Line Systems, Inc.; Greenfield Mfg. Co., Inc.; OZ Gedney Div; General Signal Corp.; Power-Strut Div; Van Huffer Tube Corp.; Unistrut Div; GTE Products Corp.

2.03 SLEEVES

- A. Fabricate sheetmetal sleeves from galvanized sheetmetal 3" and smaller - 20 gauge, 4" to 6" - 16 gauge, over 6" - 14 gauge; other sleeves shall be steel pipe Schedule 40, iron pipe ductile or cast iron, PVC Schedule 80 plastic. Provide STI EZ path where firestopping is required.

2.04 SEALS

- A. Where sleeves penetrate foundation walls below grade or exterior walls, make watertight with a watertight, non-toxic, UL classified sealing material of rubber, plastic or silicone type material supported and compressed by pressure rings.

2.05 FIRESTOP

- A. Where conduits, sleeves, etc., pass through, leave or enter fire-rated spaces; openings around conduits and equipment shall be firestopped. See Spec Section 07 84 00.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install hangers, anchors, sleeves and seals as necessary to complete the electrical work in line with NEC and interface the work with other crafts to prevent interference. All supporting devices shall be attached to the building structure for support. Arrange parallel runs to be supported on trapeze hangers when practical.
- B. In pipe shafts, vertical run conduits may be supported at every floor but support intervals must not exceed 20 ft., and conduit must be made up with threaded fittings. If over 10 ft. between supports, exposed conduits 2" and smaller shall be fastened with one hole malleable iron clamps with brass or plated machine screw. Support larger sizes with rods and ring or clevis type hangers. Support multiple runs of conduit on trapeze hangers fastened to the building structure and spaced in line with NEC, latest edition.
- C. Where concrete foundations or pedestals are indicated or required, they shall be a minimum of 3" height and extend a minimum of 2" beyond machine bed plate. Machinery shall be leveled and grouted. Anchor bolts are to be hooked or threaded with nut and plate on embedded end. Floor stands, ceiling or wall mountings shall be constructed of structural steel members and properly braced and fastened to building structure, as approved. Each Contractor shall provide his own concrete. Concrete shall be not less than 4,000# mix.
- D. Light fixtures, conduit, and other electrical equipment shall have its own supports to structural. They shall not be supported by ductwork or other mechanical systems.

END OF SECTION

SECTION 26 05 33 - RACEWAYS & BOXES FOR ELECTRICAL SYSTEMS**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install raceways, boxes and fittings where shown or indicated on the drawings and as specified herein.
- C. All wires, conductors and cables shall be installed in ferrous metal conduit unless otherwise indicated. See Section 26 05 19.

1.02 RELATED SECTIONS

- A. Divisions 00 and 01 shall be part of this Section.
- B. See power distribution, lighting, special systems, communication, heating and cooling, control and instrumentation sections for additional requirements.

PART 2 - PRODUCTS**2.01 RIGID CONDUIT**

- A. Rigid conduit shall be ferrous galvanized inside and out. Fittings shall be ferrous galvanized threaded NEC standard elbows. Crouse Hinds, OZ/Gedney or Appleton condulets. Allied, Triangle, Wheatland or approved equal. Rigid conduit may be used throughout and shall be used as follows:
 - 1. In all structural stub ups or stub downs or out of slabs, where damage is possible.
 - 2. In structural slabs.
 - 3. In slabs on grade.
 - 4. In walls next to earth.
 - 5. Underground runs.
 - 6. Exterior runs.
 - 7. Where voltage exceeds 600V.
 - 8. Where hazardous conditions require.

2.02 INTERMEDIATE METAL CONDUIT

- A. Intermediate metal conduit and fittings as outlined in NEC Article 345 shall be ferrous and galvanized inside and out. The conduit shall use only approved ferrous threaded fitting couplings and connectors. Intermediate metal conduit may be used throughout except in the following locations:
 - 1. In wet or damp areas unless fittings are threaded and approved.
 - 2. In masonry load bearing walls unless fittings are threaded and approved.
 - 3. In structure slabs and slabs on grade unless fittings are threaded and approved.
 - 4. Where voltage exceeds 600V.
 - 5. Hazardous areas.

2.03 EMT (ELECTRICAL METALLIC TUBING)

- A. EMT may be used throughout except in the following locations:
 - 1. Wet or damp areas.
 - 2. Where subject to mechanical hazards.

3. In poured concrete load bearing walls.
4. In structural slabs.
5. In slabs on grade.
6. In walls next to earth.
7. Underground runs.
8. Exterior runs.
9. Over 4" in size.

- B. EMT shall be Wheatland, Allied, Bridgeport or approved equal. Fittings shall be UL approved, galvanized, set screw type, all steel devices. No indenter type fittings shall be used. Fittings shall be Appleton, T&B, Gedney, Raco or approved equal.

2.04 FLEXIBLE METAL CONDUIT

- A. Flexible conduit may be used in dry locations as follows:
1. Fixture connections.
 2. In stud walls.
 3. In bar joist construction.
- B. Flexible conduit shall not be used where nonflexible conduit is to be installed. See Rigid Conduit Section. Flexible conduit shall be Electroflex, Anixter, International or equal. Fittings shall be malleable compression type, all steel devices, as manufactured by Appleton, T&B, Raco, Gedney or approved equal. Fittings shall be as approved by the National Electric Code and of such type as to provide an adequate ground connection.

2.05 LIQUIDTIGHT METAL CONDUIT

- A. Liquidtight metal conduit may be used where flexible metal conduit can be used and shall be used where flexible watertight connections are required to:
1. Motors.
 2. Light fixtures.
 3. Weatherproof electrical equipment.
 4. When shown on the drawings.
- B. Liquidtight conduit by DIST, AFC or Electroflex, or approved equal.

2.06 SURFACE RACEWAY

- A. Provide and install where shown on the drawings surface raceway complete with necessary boxes, fittings, closers and other appurtenances to make a complete raceway system. Material shall be surface mounted and run in a neat and orderly fashion being parallel or right angles to fixed walls, doors or other guiding lines of the building. Raceway by Wiremold, Mono Systems or approved equal and shall be prime coated with manufacturer's standard ivory color.

2.07 RIGID NON-METALLIC CONDUIT

- A. Rigid non-metallic conduit may be used in the locations as follows:
1. Direct burial underground installation.
 2. Encased or embedded in concrete.
 3. In corrosive environments that are called out on the drawings.
- B. Rigid non-metallic conduit shall NOT be used in the locations as follows:

1. Where subject to mechanical hazards.
 2. Inside buildings.
 3. In hazardous locations.
- C. Rigid non-metallic conduit shall be a minimum of Schedule 40.
- D. Provide Schedule 80 non-metallic conduit under roads and other improved surfaces.
- E. Primer/cleaner shall be used for the gluing of all joints.

2.08 FASTENERS, SUPPORTS & HANGERS

- A. See Section ELECTRICAL SUPPORTING DEVICES in this specification.

2.09 ALUMINUM CONDUITS & FITTINGS

- A. Aluminum conduits and fittings shall not be used.

2.10 OUTLET BOXES

- A. Outlet boxes connected by thinwall conduit (EMT) shall be of the galvanized steel knockout type. Switch and receptacle boxes connected by rigid conduit shall be of the cast type with threaded hubs being part of the box. Each switch or gang of switches, light, power, outlet box in the interior of the building shall be equipped with an outlet box of the appropriate type unless installed in a wireway as shown on the plans.
- B. Boxes of the knockout type shall have plaster ring erected with rim flush with the finished wall where concealed. Boxes shall have the required dimensions to accommodate all conduit and wire entering same. Minimum depth shall be 1-1/2".
- C. Boxes for telephone and data shall be 4-11/16" x 2-1/8" deep unless shown otherwise.

2.11 JUNCTION & PULL BOXES

- A. Junction and pull boxes shall be furnished and installed wherever necessary for compliance with specifications; for convenience; for wire arrangement; or for conformance with the NEC. Junction and pull boxes shall be of code grade steel coated on the inside and outside to prevent oxidation, and size shall conform to the NEC standards or larger.

PART 3 - EXECUTION

3.01 PREPARATION MATERIALS & FITTINGS

- A. Cut conduit with hacksaw or approved pipe cutter, ream ends to remove burrs, sharp edges. Do not use running threads. The use of indenter type fittings will not be permitted anywhere in the project. Set screw type steel fittings shall be used with thinwall conduit in all dry locations. Use threaded, watertight fittings with all rigid, heavy wall conduit and intermediate conduit.
- B. Conduits shall have locknuts and bushings where they enter boxes, fittings or cabinets except at threaded hubs. Install fiber type bushings on all conduit terminations larger than 1-1/4" in diameter. Thermoplastic type bushings may be used 1-1/4" and smaller sizes. Provide grounding bushing where required.
- C. Flexible metal conduit and fittings shall be used for flexible connections to motors (36" maximum) and recessed lighting fixtures (48" maximum). Use sealtight conduit in wet locations where flexible conduits are required (3 ft. maximum).

- D. Fittings such as condulets shall be used on feeder conduits 1-1/2" and smaller. Junction and pull boxes shall be used on conduits 2" and above. No condulets shall be used in telephone or TV conduits.

3.02 CONDUIT BENDS

- A. Bends shall be made with care to a radius shown in the NEC.

3.03 ABOVE GROUND INSTALLATION OF CONDUIT

- A. Install all conduits concealed unless indicated. No conduits shall be installed in or under roof insulation unless approved by the Engineer before installation. Do not expose conduit bends at floor or ceiling. Install conduit horizontal only where unavoidable, never diagonally.
- B. Install exposed conduit only after proposed runs have been checked on plans and at site for interference with work of other trades. Wherever possible, locate conduits above piping of other trades. Install exposed conduit in parallel rows neatly racked parallel or perpendicular to walls, ceilings and structural members; keep at least 3/4" from such surfaces.
- C. Locate conduits at least 12" from steam, hot water and other hot surfaces. Provide conduit expansion joints or fittings where conduit crosses building expansion joint, also in straight runs of conduit 200 ft. or longer, and shall be proper size with allowance for building expansion, contraction and settlement. Install approved watertight flashing in all conduit runs penetrating the membrane roof. Provide pipe sleeve curbs where conduits pass through interior floors.
- D. All above ground conduit shall be 1/2" or larger.

3.04 UNDERGROUND INSTALLATION OF CONDUIT

- A. All ferrous conduits coming in direct contact with the earth or sand bedding shall be coated with bitumastic #50 or similar material for the entire length of the run. Where conduits pass through outside and ground floor slabs, walls, such conduit entrance shall be grouted in and waterproofed inside and out with an approved caulking compound. Conduit in cinder fill shall be encased in a non-cinder concrete envelope at least 2" thick. Where waterproof membranes are installed below slabs, this Contractor shall use care in installing conduit and shall not puncture this membrane.
- B. In concrete construction, maintain a minimum of 3/4" cover over all conduit. Conduit shall be run parallel to the main reinforcement and maximum size in slabs shall be 1" conduit. Conduit in concrete or masonry shall be securely held in place during pouring and construction operations; provide template to hold groups of conduits terminating together, or passing through fire walls or floors. Install conduit with minimum number of joints; join with threaded couplings and fitting; make watertight with compound applied to male thread; make joints butted.
- C. Minimum cover requirements 0 - 600v; see NEC Tables.
- D. Install conduit for site lighting 6" from walks and 24" from curbs.
- E. All underground conduit shall be 1" or larger.
- F. PVC covered steel elbows shall be used in underground PVC runs.

3.05 CLEANING OF CONDUIT

- A. Clean conduits with wire brush or other approved means prior to pulling in conductors. Leave 16-gauge nylon pull cord in all empty conduits. Do not pull in conductors under the following conditions:

1. Before conduit and outlet boxes are permanently secured in place.
2. In concealed conduits located in plastered rooms, before brown scratch coat has been applied to walls/ceilings.
3. In concrete floors before slab is poured.

3.06 INSTALLATION OF ELECTRICAL BOXES & FITTINGS

- A. Install electrical boxes and fittings as indicated, in accordance with manufacturer's written instructions and applicable requirements of NEC. Draw all locknuts and fittings up tight. Provide bushings.
- B. Where located in suspended ceilings, boxes shall be attached to steel bars of sufficient length to firmly anchor the box to the ceiling supporting members. All outlet boxes shall be rigidly secured in place. Where fixtures shall be used, the outlet boxes shall be equipped with fixture studs. Where boxes are in brick, tile or other masonry which will not be plastered, deep sectional boxes shall be used, and they shall be completely covered with the plates or fixtures. Electricians shall cooperate with the bricklayers so no ragged joints will be exposed.
- C. Surface-mounted boxes shall be fastened to walls by use of plastic anchors and machine screws. Boxes located in between joist construction shall be fastened to the joist by use of metal strut fastened to the joists if fixtures are to be hung from the box.
- D. Coordinate with other crafts to locate boxes and fittings as shown on the drawings. Provide weathertight boxes where shown marked W.P. Close all unused holes in all boxes. Provide access to all boxes and avoid back-to-back in walls. No aluminum boxes or fittings will be used in concrete. Set boxes plumb and flush with the finished wall where recessed.
- E. Ground all boxes in line with National Electrical Code.

3.07 ALIGNMENT & LOCATION OF OUTLETS

- A. The below dimensions are given to assist the Contractor in estimating. The exact location shall be obtained from the Engineer at the time of installation or as shown on the drawings (consult architectural drawings). All measurements shall be taken from the Architect's general construction drawings. Mounting heights of equipment shall be as tabulated below:

1. Wall switches	42" or as noted
2. Thermostats	42" or as noted
3. Convenience receptacles – general wall type	1'6" or as noted
4. Panels	5'0"
5. Telephone/data	1'6" or as noted
6. Pushbutton station	5'0"
7. Disconnect switches	5'0"
8. Outdoor receptacles	4'0" or as noted
9. Motor starter	5'0"
10. Fire alarm stations	42"
11. Fire alarm horns/strobes	90" or as noted

- B. Heights are given from center of outlet or box to finished floor except as noted.
- C. Electrical Contractor to review mechanical and architectural drawings and notify Architect/Engineer where conflicts exist prior to starting work in any given area.
- D. Devices on opposite sides of fire-rated walls shall be spaced accordingly to conform to all applicable codes and maintain fire rating of wall.

END OF SECTION

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install electrical identification where shown or indicated on the drawings and as specified herein.
- C. Electrical identification shall be provided for buried cables, electrical power, control and communication conductors, phase relationships, nameplates, signs.
- D. Samples shall be submitted upon request by the Engineer.

1.02 SUBMITTALS

- A. Shop Drawings shall be submitted for approval for equipment as follows:
 - 1. Index of identification labels.
 - 2. Index of nameplates.
- B. Samples of each type of proposed label and/or signs shall be submitted for examination/approval as requested.
- C. Record Drawings - The Contractor shall keep layout plans on the job site, marking all changes made during installation. A set of as-built/record drawings shall be submitted.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Wire coding shall be insulation colors, painting, taping or precolored manufactured permanent plastic colors.
- B. Branch, feeder and service colors 600 volts and below shall be:

<u>Color</u>	<u>Phase</u>
Black	A or 1
Red	B or 2
Blue	C or 3 (where applicable)
White	Neutral
Green	Equipment Ground
- C. Underground plastic tape shall be a minimum of 6" wide and shall be red in color with "Danger: Electrical Cables Buried Beneath" or a standard manufacturer's logo. Tape shall have an embedded continuous metallic strip or core.
- D. Plastic Tags. Manufactured, preprinted, accident prevention and operational tags. Approximately 3x5. Fasten with ty wraps or other nonconductive ties.
- E. Engraved plastic laminate, black face and white letters punched for mechanical fasteners.

PART 3 - EXECUTION**3.01 NAMEPLATES - PLASTIC LAMINATE**

- A. This Contractor shall furnish and install nameplates as herein specified. All nameplates shall be black-white-black laminated 1/8" plastic plates. Letters or numbers shall be cut through the black and into the white of the plate. Inscriptions shall be symmetrical about the centerlines of plates and the plates shall be attached to surface with self-tapping screws.
1. This identification shall indicate main switches, feeder number where feeder serves a number of branch circuit panelboards, or special equipment where this equipment operates from a separate feeder, disconnects and control equipment.
 2. All branch circuit panelboards shall be identified as to letter designated on the drawings. Plastic plates as described in the above paragraph shall be used for this purpose and shall be attached to the inside of panelboard trim.
 3. Each branch circuit panelboard cabinet shall be furnished with a clear plastic covered, typed circuit schedule mounted in a metal card holder. Each protective device shall be numbered consecutively at the device.
 4. All disconnect switches, devices and controls for motors and equipment shall be identified with plastic plates as specified in the first paragraph.
 5. Equipment and controls, where remotely located from each other, shall have included in the identification the final room number and unit number of the associated equipment and/or controls. Final room numbers will be furnished by the Owner. Equipment numbers should correspond to numbers for associated equipment.

END OF SECTION

SECTION 26 27 26 - WIRING DEVICES**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install wiring devices where shown or indicated on the drawings and as specified herein.
- C. Typical wiring devices are:
 - 1. Receptacles
 - 2. Ground-fault circuit interrupters
 - 3. Switches
 - 4. Wallplates
- D. Colors shall be:
 - 1. Devices - White (Note: must be approved by Architect at shop drawing)
 - 2. Plates - Stainless Steel
- E. Contractor is responsible for matching color of all wiring devices, lighting controls, low voltage and technology.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Some of the known manufacturers are, but not limited to, as follows: Cooper; Hubbell, Inc.; Leviton Mfg. Co.; Pass and Seymour, Inc.

2.02 WALL PLATES

- A. Wall plates shall be stainless steel switch or receptacle plates for indoor use in finished spaces. Configuration to fit the device.

2.03 SWITCHES

- A. Switches

Single pole	Cooper 2221
3-way	Cooper 2223
4-way	Cooper 2224
- B. Rated 120/277V, 20 amp.

2.04 RECEPTACLES

- A. 120V, 15 amp, single phase duplex grounded type, tamper resistant - Cooper TRBR15.
- B. 120V, 20 amp, single phase duplex grounded type, tamper resistant - Cooper TRBR20. (15 amp is not allowed.)
- C. GFI - Cooper TRVGR20 - 20 amp proper rectangular plate, tamper resistant. Install where required by

code.

- D. Outdoor convenience outlets shall be GFI receptacle as per Receptacles above with Cooper WLRD-1 weatherproof plate for damp locations. Provide Cooper 4966 or equal for wet locations.

2.05 GROUND FAULT PROTECTION

- A. Ground fault protection shall be provided in line with the NEC for construction sites.

PART 3 - EXECUTION

3.01 GENERAL

- A. Switches shown ganged on drawings shall be installed under one plate, having the number of openings required. Sectional plates shall not be used to make up the required number of gangs. All plates for block or brick walls shall be jumbo size. All plates in one room or space shall be of the same size (i.e., jumbo or standard).
- B. Surface or flush mounted outlet boxes shown in the working areas shall be appropriate steel or cast plates, galvanized or cadmium plated as required to fit the box and the device located in the box.
- C. Coordinate with others such as block work, painting, etc., to interface the wiring devices with other work.
- D. Install wiring devices after wiring has been pulled.
- E. Install wall plates after painting has been completed.
- F. Ground all devices in line with National Electrical Code.
- G. After installation, test the devices for opens, shorts, grounds, improper circuit connectors, and polarity.
- H. All devices shall be marked on the back of the plate in permanent marker and on the front of the plate in "Kroy" tape or similar with the panel and circuit designation.

END OF SECTION

SECTION 26 28 13 - FUSES**PART 1 - GENERAL****1.01 SUMMARY**

- A. Fuses
- B. See Equipment Schedule and Switchboard Schedules on drawings.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. Fuses in switchboard, 600 amperes and larger:
 - 1. Bussman Class L, Limitron KTU (or Hi Cap KRP-C)
 - 2. Ferraz Shawmut Class L, Amp Trap A4BY
 - 3. Littelfuse Class L, KLP-C
- B. Fuses for feeder circuits:
 - 1. Bussman Low Peak, LPN-RK (250V) or LPS-RK (600V)
 - 2. Ferraz Shawmut Amp-Trap II, A2D-R (250V) and A6D-R (600V)
 - 3. Littelfuse, Little Peak, LLN-RK (250V) or LLS-RK (600V)
- C. Fuses for motor circuits:
 - 1. Bussman Fusetron, FRN-R (250V), and FRS-R (600V)
 - 2. Ferraz Shawmut Trionic, TR-R (250V) and TRS-R (600V)
 - 3. Littelfuse Slo-Blo, FLN-RL (250V) or FLS-R (600V)
- D. Special application:
 - 1. For in-line fuses and weatherproof assembly, provide Bussman Tron Type HEB fuse holder and Type KTK fuse with 1A0513 boot or equal.
 - 2. For protection of control circuit transformers, provide Bussman Type FNQ time delay fuses or equal.

2.02 MATERIALS

- A. All fuses shall be of the same manufacturer.
- B. Fuses for feeder circuits, 600 amperes and less:
 - 1. UL, Class RKf1, current limiting time delay with interrupting ratings of 200,000 amperes.
 - 2. Shall also protect motor loads served from main switchboard.
 - 3. Shall be rejection type.
- C. Fuses for motor circuits, 600 amperes and less:
 - 1. UL, Class RK5, time delay with interrupting ratings of 200,000 amperes.
 - 2. Shall also serve remote fused disconnect switches.
 - 3. Shall be rejection type.
- D. Provide one set of spare fuses for each size and type of fuse represented on project.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. All fusible switches either separately mounted or panel mounted shall be equipped with fuses as specified herein.
- B. Provide label inside each switch and motor starter cover stating type of fuse required for replacement.
- C. Fuses shall not be installed until equipment is ready to be energized.

END OF SECTION

SECTION 26 28 16 - ENCLOSED SWITCHES & CIRCUIT BREAKERS**PART 1 - GENERAL****1.01 SUMMARY**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, materials, equipment and services necessary to furnish and install circuit and motor disconnects where shown or indicated on the drawings and as specified herein.
- C. The Contractor shall be responsible for the complete installation of electrical wiring as specified hereinafter and shown on the electrical drawings.
- D. Types of circuit and motor disconnect switches in this Section include the following:
 - 1. Equipment disconnects.
 - 2. Appliance disconnects.
 - 3. Motor-circuit disconnects.
- E. Wires/cables, raceways, and electrical boxes and fittings required in connection with circuit and motor disconnect work are specified in other Division 16 Basic Electrical Materials and Methods sections.

1.02 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of circuit and motor disconnect switches of types and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Installer's Qualifications: Firm with at least 3 years of successful installation experience with projects utilizing circuit and motor disconnect work similar to that required for this project.
- C. NEC Compliance: Comply with NEC requirements pertaining to construction installation of electrical circuit and motor disconnect devices.

1.03 SUBMITTALS

- A. Submit shop drawings of electrical circuit and motor disconnect switches showing accurately scaled switches, their layouts and proximity to associated equipment.

1.04 DISCONNECTS

- A. Disconnects shall be provided for all motors as required by code. Outlets for motors shall be located after the motor location has been determined.
- B. Disconnect switches shall be motor-rated switches, fused unless noted otherwise. Where a disconnect and starter are required or shown in one location, a combination switch and starter may be provided.
- C. All cabinet heaters, unit ventilators and roof exhaust fans shall have disconnects mounted within the unit enclosures. Disconnects shall usually be provided by the supplier of this equipment (check mechanical specifications and equipment schedules).
- D. Motor disconnects shall have auxiliary pole for control circuit disconnect where required and shall have provision for locking off the switch.

1.05 CIRCUIT DISCONNECTS (SAFETY SWITCHES)

- A. Furnish and install enclosed safety switches where shown on the drawings or otherwise required by Code. Safety switches shall be equipped with low peak or equal and approved type delay fuses of proper current capacity and voltage. Switches shall be Type HD. Type GD shall not be allowed.

1.06 FUSES

- A. Fuses shall be furnished in ratings suitable for the particular application. This rating shall be such as to give protection to cable, motors or other equipment which the fuses are protecting. Disconnects shall be provided with time delay fuses or equal type or as recommended by the equipment manufacturer. Other fuses shall be as specified. Contractor shall field verify all nameplate ratings of equipment installed and provide proper sized fuses.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. All disconnects shall be UL listed and labeled for 250V or 600V as the case may be.

2.02 DISCONNECT SWITCHES

- A. General-Duty Disconnect Switches: Provide surface-mounted, general-duty type, sheet-steel enclosed switches of types, sizes, and electrical characteristics indicated; rated 240V, 60 Hz, with 3 blades, 3 poles; and incorporating spring-assisted, quick-make, quick-break switches which are so constructed that switch blades are visible in OFF position with door open. Equipment with operating handle which is integral part of enclosure base and whose operating position is easily recognizable, and is capable of being padlocked in OFF position. NEMA 3R disconnects shall be capable of being locked in the ON and OFF positions. Construct current carrying parts of high-conductivity copper, with silver-tungsten type switch contacts, and stamped enclosure knockouts. Provide NEMA Type enclosures as called out. Provide a minimum of NEMA 3R outdoors.
- B. Heavy-Duty Safety Switches: Provide surface-mounted, heavy-duty type, sheet-steel enclosed safety switches of types, sizes, and electrical characteristics indicated; fusible type, rated 600V, 60 Hz, 3 blades, 4 poles, solid neutral; and incorporating quick-make, quick-break type switches; construct so that switch blades are visible in OFF position with door open. Equip with operating handle which is integral part of enclosure base and whose operating position is easily recognizable, and is padlockable in OFF position; construct current carrying parts of high-conductivity copper, with silver-tungsten type switch contacts, and positive pressure type reinforced fuse clips. Provide NEMA Type enclosures as called out. Provide a minimum of NEMA 3R outdoors.

2.03 MANUFACTURERS

- A. Some of the known manufacturers are, but not limited to, as follows: Cutler-Hammer, Inc.; Bussmann; General Electric Co.; Siemens; Square D Company; or approved equal.
- B. See motor and equipment schedules for equipment to be supplied and installed by the Electrical Contractor.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Coordinate the location of control and disconnects with others to best use the available space and provide clearances for electrical gear as required by National Electrical Code.
- B. Install disconnect switches for use with motor-driven equipment within sight of the motor and the

controller location.

- C. Ground all motor control and disconnects to provide the necessary electrical safety required by NEC.
- D. Install all fuses of the proper size. Verify all nameplate ratings.

3.02 FIELD QUALITY CONTROL

- A. Subsequent to completion of installation of electrical disconnect switches, energize circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at project site, then retest to demonstrate compliance; otherwise remove and replace with new units and retest.

END OF SECTION

SECTION 26 51 00 - LIGHTING**PART 1 - GENERAL****1.01 SCOPE OF WORK**

- A. The Conditions of the Contract and the Provisions of Division 01 apply to all work of this Section.
- B. This Section includes all labor, material, equipment and services necessary to furnish and install all lighting as shown on the drawings and specified herein.

1.02 SUMMARY

- A. Systems included:

Interior & Exterior Lighting	Lamps & Ballasts
Emergency Lighting	Lighting Controls
Exit Lights	Lighting - Misc.
- B. Provide lighting fixtures of sizes, types and ratings indicated; complete with, but not limited to, housings, lamps, lamp holders, reflectors, energy-efficient ballasts, starters and wiring. Fixtures shall be factory assembled with parts required for a complete installation. Fixtures shall have concealed hinges and catches, with metal parts grounded as common unit and so constructed as to dampen ballast generated sounds.
- C. Wiring - Provide electrical wiring within fixture suitable for connecting to branch circuit wiring.
- D. Samples shall be supplied upon request from Engineer.

1.03 SUBMITTALS

- A. Shop Drawings - Submit fixture shop drawings in booklet form with separate sheet for each fixture, assembled in "luminaire type" with proposed fixture and accessories clearly indicated on each sheet.

1.04 DELIVERY, STORAGE & HANDLING

- A. Handle lighting fixtures carefully to prevent damage, breaking and scoring. Do not install damaged fixtures or components; replace with new.
- B. Store lighting fixtures in clean, dry place. Protect from weather, dirt, fumes, water, construction debris and physical damage.

1.05 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of interior lighting fixtures, of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer's Qualifications: Firms with at least 3 years of successful installation experience on projects with interior lighting fixture work similar to that required for project.
- C. Codes and Standards:
 - 1. UL Compliance: Comply with UL standards pertaining to interior lighting fixtures. Provide interior lighting fixtures and components which are UL listed and labeled.
 - 2. CBM Labels: Provide fluorescent lamp ballasts which comply with Certified Ballast Manufacturers' Association standards and carry the CBM label.
 - 3. Energy Code Compliance: Three lamp fluorescent fixtures, if installed within 10 ft. of each other

shall have the single lamps of the two fixtures wired together on one 2 lamp ballast as per Minnesota Energy Code.

PART 2 - PRODUCTS

2.01 FIXTURE SCHEDULE (as indicated on drawings)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install interior lighting fixtures at locations and heights as indicated and in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation," NEMA standards and with recognized industry practices to ensure that lighting fixtures fulfill requirements.
- B. Coordinate with other trades as appropriate to properly interface installation of interior lighting fixtures with other work.
- C. Fixtures shall be located approximately as shown on plans. On tile ceilings, fixtures shall be located either in the center of a tile or on the division between two tiles. Fixture shall be located symmetrically in the spaces except where plan indicated a specified lighting purpose can be best accomplished by a non-symmetrically arrangement.
- D. Handling and installation of fixtures shall be done by experienced fixture hangers under the supervision of an experienced foreman. Splices and joints for fixtures shall be made up using insulated "Scotch-Loks" or solderless pressure connections.
- E. Submit design of hangers, method of fastening, other than indicated or specified herein, for review by Architect/Engineer.
- F. Install flush-mounted fixtures to eliminate light leakage between fixture frame and finished surface.
- G. Provide plaster frames for recessed fixtures installed in other than suspended grid type acoustical ceiling systems. Brace frames temporarily to prevent distortion during handling.
- H. Secure fixtures to the structure by means of approved fasteners. Fixtures shall not be secured to the wall or ceiling finish only. Where necessary to give support or ceilings made up of non-structural materials, the fixtures shall be supported from a special brace, such as Unistrut, Globe Strut, etc., secured in turn to structural members. Support will come from the bar joist ceiling when available.
- I. Ensure that pendant fixtures are plumb and level. Provide individually mounted pendant fixtures with stems longer than 2' with twin stem hangers. Provide stem hanger with ball aligners and provisions for minimum 1" vertical adjustment. Mount continuous rows of fixtures with an additional stem hanger than number of fixtures in the row.
- J. Tighten connectors and terminals, including screws and bolts, to comply with tightening torques specified in UL Stds 486A and B.
- K. Support surface-mounted fixtures greater than 2' in length at another point in addition to the outlet box fixture stud.
- L. Where existing fixtures are being replaced, the Contractor shall provide all necessary framing, patching and painting necessary to match the existing conditions and be "like new" installation.

3.02 ADJUSTING & CLEANING

- A. Before the lighting installation will be inspected, all fixtures must be complete and cleaned immediately prior to time of inspection.
- B. Protect installed fixtures from damage during remainder of construction period.

3.03 ORDERING FIXTURES

- A. Before placing orders for fixtures, the Contractor shall verify that fixtures have labels indicating Underwriter's approval. All fluorescent fixtures shall have high power factor, CBMETL certified, sound rated A ballasts, solid state electronic type, except where not available due to the lamp type and wattage. Fixtures shall meet State Energy Code requirements. Ballasts shall have thermal protection.
- B. The Contractor shall furnish and install all incandescent, fluorescent and HID lamps installed in all fixtures.

3.04 FIELD QUALITY CONTROL

- A. Upon completion of installation of interior lighting fixtures and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
- B. Coordinate the electrical work with other crafts to prevent interference with ducts, pipes, etc.
- C. See Basic Materials and Methods for wiring. Splices must be made in boxes or channels. No splices shall be made in conduits or other raceways not approved for the purpose.

3.05 GROUNDING

- A. Provide equipment grounding connections for interior and exterior lighting fixtures as indicated. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounds.

3.06 FLUORESCENT BALLASTS

- A. All light fixtures with ballasts shall be provided with a ballast disconnect.

END OF SECTION

SECTION 26 51 14 – LED LIGHTING**PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. The Drawings, the provisions of the Contract including the General and Supplementary Conditions and the General Requirements apply to the work of this Section.

1.02 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by their basic designation only.
- B. American National Standards Institute (ANSI)
1. ANSI C62.41.1-2002 – IEEE Guide on the Surge Environment in Low-Voltage (1000V and less) AC Power Circuits
 2. ANSI C62.41.2-2002 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000W and less) AC Power Circuits
 3. ANSI C82.SSL1 – SSL Drivers (in ANSI development)
- C. American Society for Testing and Materials International (ASTM)
1. ASTM B117-97 – Standard Practice for Operating Salt Spray (Fog) Apparatus
 2. ASTM G53 – Standard Practice for Operating Light and Water Exposure Apparatus (Fluorescent UV – Condensation Type) for exposure of Non-Metallic Materials
- D. Illuminating Engineering Society of North America (IESNA)
1. G-1-03, Guidelines for Security Lighting
 2. LM-64-01, Photometric Measurements of Parking Areas
 3. LM-79-08, IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
 4. LM-80-08, IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources
- E. International Electrotechnical Commission (IEC)
1. IEC 60529 – Degrees of Protection provided by enclosures (IPCode)
- F. National Electrical Manufacturers Association (NEMA)
1. ANSI/NEMA/ANSI C78.377-2008 – American National Standard for the Chromaticity of Solid State Lighting Products
 2. WD 7-2000 NEMA Guide Publication: *Occupancy Motion Sensors*
- G. National Fire Protection Association (NFPA)
1. NFPA 70 – National Electrical Code (NEC)

1.03 QUALITY ASSURANCE

- A. Conduct testing per the applicable IESNA and ANSI approved methods for products using Solid-State Lighting (SSL) sources. Test laboratories must be either National Voluntary Laboratory Accreditation Program (NVLAP) accredited for solid-state lighting testing as part of the Energy-Efficient Lighting Products laboratory accreditation program or one of the qualified labs listed on the Doe SSL web site (http://www1.eere.energy.gov/buildings/ssl/test_labs.html) .
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

1.04 SUBMITTALS

- A. Performance Reports: Submit the following for approval when required by the Site Owner:
 - 1. Luminaire photometric reports per IESNA LM-79-08 including: laboratory name, report number, date, luminaire catalog number, and luminaire/light source specifications. Report must contain lumen values in BUG zones per IESNA TM-15-07 and Roadway Type classifications, luminous Intensity, zonal lumen summary, and an iso-footcandle diagram per LM-31 as well as documentation that specified standards and test methods were followed.
 - 2. Provide documentation of the expected useful life as defined in Section 2.05 including the testing and calculation of useful life and verification of the lighting performance at that life.
- B. Shop Drawings shall be submitted for approval for the following:
 - 1. Luminaires
- C. Product Data: For each type of luminaire, arranged in order of luminaire designation. Include data on features, accessories, finishes and the following:
 - 1. Physical description of luminaire, including dimensions.
 - 2. Life, output and energy-efficiency data for lamps.
 - 3. Materials, dimensions and finishes of poles.
 - 4. Means of attaching luminaires to supports and indication that attachment is suitable for components involved.
 - 5. Manufactured pole foundations.
 - 6. Anchor bolts for poles.
 - 7. Photometric data, in IESNA format, based on laboratory tests of each luminaire type and accessories identical to those indicated for the luminaire as applied in this Project.
- D. Shop Drawings: Show details of non-standard or custom luminaires. Indicate dimensions, weights, methods of field assembly, components, features and accessories.
 - 1. Wiring Diagrams: Power and control wiring.
- E. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, maintenance and warranty data manuals.
- F. Warranties: Special warranties specified in this Section.
- G. Samples of any proposed luminaire substitutions shall be submitted for examination/approval as requested.

1.05 WARRANTY

- A. Standard Warranty:

1. Provide a written **five-year** on-site replacement material, fixture finish and workmanship warranty. On-site replacement includes transportation, removal and installation of new products. Finish warranty must include warranty against failure or substantial deterioration such as blistering, cracking, peeling, chalking or fading.
2. Provide a written **five-year** replacement material warranty for defective or non-starting LED source assemblies.
3. Provide a written **five-year** replacement material warranty on all power supply units (PSUs).
4. Provide a written **five-year** replacement warranty for luminaires producing inadequately-maintained illuminance levels at end of warranty period, as prorated from levels expected at end of useful life. For example, a luminaire expected to produce 70% of initial lumens at 100,000 hours would be expected to last over 11 years (continuous operation), so levels would be expected to be at 87% of initial at end of five-year warranty period. Warranty must cover all light sources (LED package, LED array or LED module) including, but not limited to the LED die, encapsulate and phosphor. If the expected useful life of the luminaire system as defined in Section 2.05 is not maintained, then the manufacturer must replace the light source(s) or luminaire as needed.
5. Warranty period must begin on date of possession. The supplier will provide the Owner with appropriate signed warranty certificates. The Owner must receive certificates.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Luminaires must be the type indicated on Drawings and as specified. Fixtures of the same type must be provided by one manufacturer.
- B. All electrical equipment and material shall be new and bear a recognized testing laboratory's label, where applicable. The type of equipment and/or material shall be designated by the location where it will be installed and so defined by NEMA/NFPA 70 standards.
- C. Provide luminaires with lamps for each outlet shown on the Drawings and as specified herein. See luminaire schedule on the Drawings.
- D. The type of luminaires required are as noted by a capital letter on the Drawings. Contractor shall be solely responsible for the exact quantities. Any outlets not specifically noted on the Drawings shall be equipped with luminaires similar to those in rooms used for like purposes. No extra compensation will be allowed for luminaires for lighting outlets required, but not noted with luminaire type.
- E. All housing finishes must be baked-on enamel, anodized, or powder-coated, unless otherwise specified in subsections below.

2.02 MANUFACTURERS

- A. In Luminaire Schedule and subject to compliance with requirements below, provide products by one of the manufacturers shown in schedule.

2.03 LIGHT SOURCE REQUIREMENTS

- A. LED sources must meet the following requirements:
 1. Luminaires must be rated for -40°C to +50°C operation
 2. Correlated Color Temperature (CCT) shall be Nominal CCT:4000 K (3985 ± 275)

3. Duv tolerance of 0.001 ± 0.006
4. Color Rendering Index (CRI): ≥ 65
5. Luminaire manufacturer must submit reliability reports indicating that the manufacturer of the LED (chip, diode or package) has performed JEDEC (Joint Electron Devices Engineering Council) reliability tests on the LEDs as follows:
 - a. High Temperature Operating Life (HTOL)
 - b. Room Temperature Operating Life (RTOL)
 - c. Low Temperature Operating Life (LTOL)
 - d. Powered Temperature Cycle (PTMCL)
 - e. Non-Operating Thermal Shock (TMSK)
 - f. Mechanical Shock
 - g. Variable Vibration Frequency
 - h. Solder Heat Resistance (SHR)

2.04 DRIVER REQUIREMENTS

- A. Power Supply Units (PSUs) including drivers must meet the following requirements:
 1. Must have a minimum efficiency of 85%
 2. Must be rated to operate between -40°C to $+50^{\circ}\text{C}$
 3. Input Voltage: Capable of 120 to 480 ($\pm 10\%$) volt, single phase
 4. Power supplies can be UL Class I or II output
 5. Operating frequency must be 60 Hz
 6. Drivers must have a Power Factor (PF) of: $\geq 20\%$
 7. Drivers must have a Total Harmonic Distortion (THD) of: $\leq 20\%$
 8. Drivers must comply with FCC 47 CFR Part 15 Non-Consumer RFI/EMI standards
 9. Drivers must be Reduction of Hazardous Substances (RoHS) compliant

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

- A. Luminaires shall be installed in a neat and workmanlike manner. The NEIS Standard Practices for Good Workmanship in Electrical Contracting NECA 1-2006 is hereby adopted to define such workmanship and the installation of conductors and cables.
- B. Provide all equipment, wiring, conduit and junction boxes required for the installation of a complete and operating system in accordance with applicable local, state and national codes, the manufacturer's recommendations, these plans and specifications.

3.02 EXAMINATION

- A. Examine conditions for compliance with lighting fixture (luminaire) and ambient-temperature requirements for each luminaire.
- B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and

manufacturer's written instructions.

- C. Examine walls, floors, roofs and concrete bases for suitable mounting conditions where luminaire will be installed.
- D. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met.

3.03 INSTALLATION

- A. Luminaires: Set level, plumb and square with ceilings and walls. Install lamps in each fixture.
- B. Suspended Luminaire Support:
 - 1. Pendants and Rods: Where longer than 48", brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors."
- D. Provide luminaires and installations to meet seismic requirements of Codes and Standards and AHJ.

3.04 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

3.05 COORDINATION

- A. Coordinate layout and installation of luminaires and suspension system with other construction that penetrates ceiling or is supported by them, including HVAC equipment, fire suppression system and partition assemblies.

END OF SECTION