SECTION 01010
SUMMARY OF WORK

PART 1 _ GENERAL

1.01 DESCRIPTION

A. The work described by the Specifications and Drawings include construction of a picnic shelter, drives/walk, play area and site improvements at GARY NEW DULUTH COMMUNITY CENTER AND RECREATION AREA in Duluth, Minnesota. The work generally includes:

1. **Gary New Duluth Park Improvements**: Mobilization, grading and earthwork; construction of drainage improvements, parking improvements, picnic shelter and sidewalks; and site furnishings; landscaping and sodding; project close-out; and coordination of work to be performed by the selected contractor.

2. The property is owned by the City of Duluth

B. The construction contract will be with City of Duluth and will be administered by the City of Duluth.

C. Work is covered in the following standard divisions:

1. Division 1 - General Requirements
2. Division 2 - Site Work
3. Division 3 - Concrete
4. Division 5 - Metal
5. Division 9 - Finishes
6 Division 13 - Prefabricated Buildings

1.02 SCOPE

A. Furnish all material, labor, equipment, and perform all operations necessary to complete the construction.

1.03 EXAMINATION OF SITE

A. Failure to visit the site will not relieve the contractor from requirements for furnishing materials or performing work that may be required to complete work in accordance with the contract.

1.04 CONTRACTS

A. Construct the work under unit priced contract. Payment for items listed in the Bid Form will be paid for based on the bid price.

1.05 CONTRACTORS USE OF PREMISES

A. Limit the use of the site to areas within the Limits of Construction and the marshaling area.

B. Contractor assumes full responsibility for the protection and safekeeping of products obtained under this contract and stored on the site.

1.06 EXISTING UTILITIES

A. Protect all existing utilities from damage during construction. The contractor shall have utility companies field locate facilities prior to beginning construction and shall immediately notify the Owner's Representative of any utilities encountered which are not indicated on the plans.

B. The contractor shall notify the Owner's Representative immediately if a utility is damaged. The contractor shall be fully responsible, at no cost to the Owner, for all repairs including penalties, if any, due to disruption of service.

1.07 COORDINATION

A. Coordinate work with the various sections of the specifications to assure efficient and orderly sequence of installation of construction elements, with provisions accommodating items installed later.

B. Verify characteristics of elements of interrelated operating equipment which are compatible; coordinate work of various sections having interdependent responsibilities for installing connecting to, and placing in service such equipment.

C. Contact adjacent property owners and businesses, where appropriate. Keep them informed of work schedule.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01800
DEFINITION OF BID ITEMS

PART 1 - G E N E R A L

1.01 - INCLUDED - The following describes the scope of work for this contract and is further clarified through limit-of-work lines, notes on the Drawings, and the Specifications. The following summary is provided to briefly describe the project, is not intended to be a complete description of the work required to complete the project, and does not in any way supersede the information contained in the Drawings and Specifications. The work described may contain work from one or more technical Specification sections. The Contractor shall refer to the technical Specifications which apply to the individual components. Items may be listed in the Specifications which are not part of this construction contract. Items shall include a pro rata share of materials, labor, protection of existing improvements, testing, guarantees, profit, taxes, bonds, overhead, and all other related, incidental work or costs necessary for completion.

A. BASE BID ITEMS

Bid Item #1
General Requirements/Mobilization. Payment shall include the mobilization of equipment, personnel, and materials at the project site in preparation for work on the project. This item shall also include the establishment of the Contractor's offices, necessary facilities, related temporary utilities, and such other costs as may be incurred in preparing to perform the Work. The cost of required bonds and permits is included in this item.

Contractor responsible for coordination and payment of necessary permits, testing and inspections. These items to be included in this item.

The removal of the Contractor's equipment, temporary fencing, supplies, offices and temporary utilities, and cleanup of the site are included in this item.

Total amount for this bid item shall not exceed three percent (3%) of the total Base Bid. Measurement for payment shall be on a lump sum basis.

Bid Item #2
Demolition/Site Preparation. Construction layout and surveys; location and protection of existing utilities and trees to remain, retaining walls, buildings; installation of bio-rolls, silt fence or hay bales, temporary drainage control and drainage of excavations; removal and off-site disposal of stripped sod, fencing (base course on basckstop only), gravel lot, light poles, trash and debris; stripping and stockpiling of topsoil; removal of abandoned underground irrigation lines; and all related work. Measurement for payment will be on a lump sum basis.

Bid Item #3
Earthwork/Grading. Includes excavation for sports fields; grading for subgrades; placement of fabric, drain tile system and re-placement of sand and topsoil as needed within landscape areas; the placement of raingarden mix; miscellaneous excavation; trenching, backfilling and compaction; hauling and disposal of excess excavation (if necessary); finish grading; clean up; and all related work. Measurement for payment will be on a lump sum basis.

Bid Item #4
Storm Sewer Installation. Includes excavation and base prep for installation of owner supplied 24” or 30” RCP pipe, owner supplied flared ends and two owner supplied catch basins; compaction for subgrades and placement of structures with consideration for future elevation; placement of sub-base, placement of sand, backfill and topsoil, compaction, testing and inspection as needed within necessary

areas; miscellaneous excavation; hauling and disposal of excess excavation (if necessary); finish grading; clean up; and all related work. All work shall meet the City of Duluth standards for storm sewer construction. Measurement for payment will be on a lump sum basis.

Bid Item #5
Concrete Paving/Sidewalk. Includes concrete (4000 psi min) excavation, subgrade preparation, form work, fiber mesh reinforcement and accessories, expansion joints, concrete placement and finishing, tooled joints, curing, backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for sidewalk construction. Measurement for payment will be a lump sum basis

Bid Item #6
Concrete Curbing. Includes concrete (4000 psi min.) excavation, subgrade preparation, form work, fiber mesh reinforced concrete and accessories, expansion joints, concrete placement and finishing, tooled joints, curing, backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for sidewalk construction. ***The parking lot curbing is the only curbing, curbing shown along 101st and Carterette is for coordination only.** Measurement for payment will be a lump sum basis

Bid Item #7
Asphaltic Paving. Includes excavation, subgrade preparation, asphaltic pavement, tack coatings, subgrade and fabric as detailed; placement and finishing, 4" striping shall be incidental to the pavement; backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for street construction. Measurement for payment will be a lump sum basis

Bid Item #8
Pervious Brick Pavers. Includes excavation, subgrade preparation, concrete brick pavers (8cm – 8000 psi, min.), drain tile as drawn with all incidental connections; subgrade and fabric as detailed; placement and finishing, 4" striping shall be incidental to the pavement; backfilling and compaction, and all related work. Measurement for payment will be a lump sum basis

Bid Item #9
Pedestrian Plaza. Includes excavation, subgrade preparation, form work, concrete pavers and/or concrete with fiber mesh reinforcement and accessories, expansion joints, concrete placement and finishing, tooled joints, curing, striping, backfilling and compaction, and all related work. Measurement for payment will be a lump sum basis.

Bid Item #10
Structure. Includes shelter 40'x40' as drawn or pre-approved equal, shop drawings with structural signature (if not provided by supplier); excavation, subgrade preparation, form work, concrete foundation with rebar and conduit; concrete with fiber reinforcement and accessories, curing, striping, backfilling and compaction; light and electrical fixtures shall be incidental to the shelter; and all related work. Measurement for payment will be a lump sum basis.

Bid Item #11
Lighting. Includes 25' tall fixtures dark sky fixture (color: black), electrical design with signature, shop drawings with structural signature for footing design; excavation, subgrade preparation, form work, concrete footing with rebar and conduit; electrical design with signature and shop drawings for approval, concrete with reinforcement and accessories, curing, backfilling and compaction, and all related work. Provide a lighting design that will meet the City of Duluth UDC requirements for site lighting. Measurement for payment will be a lump sum basis.

Bid Item #12

Trash Receptacle. Payment includes all shipping, layout, excavation and subgrade preparation, concrete for base, miscellaneous equipment, installation of trash receptacle, and all related work. Measurement of payment shall be lump sum installed.

Bid Item #13
Wood Mulch 4" Depth. Includes subgrade preparation, fabric, hauling, placement to the proper depth, raking to a level surface, and all related work. Measurement for payment will be lump sum installed.

Bid Item #14
Bluegrass Sod. Payment includes soil preparation, fertilization, fine grading, large (48” wide in sport play areas) roll sodding, required pegging, maintenance, and all other related work. Measurement for payment will be lump sum installed.

Bid Item #15
2" Caliper Deciduous Trees. Payment includes excavation and subgrade preparation; placement of plant in pit; removal of wire basket, burlap and twine; preparation and placement of backfill mix; staking and guying; installing a 2' tree ring with 3" of wood mulch (when in turf); and all related work. Measurement for payment shall be lump sum installed.

Bid Item #16
5 Gallon Deciduous Shrubs. Payment includes excavation and subgrade preparation, removal of container and placement of plant in pit, preparation and placement of backfill mix, and all related work. Measurement for payment shall be lump sum installed.

Bid Item #17
5 Gallon Evergreen Shrubs. Payment includes excavation and subgrade preparation, removal of container and placement of plant in pit, preparation and placement of backfill mix, and all related work. Measurement for payment shall be lump sum installed.

Bid Item #18
Chain Link Fencing Work. Contractor to include coordination with other contractors as needed. Measurement for payment shall be incidental to the project.

Bid Item #19
Irrigation work. Contractor to include coordination with other contractors as needed. Measurement for payment shall be incidental to the project.

Bid Item #20
Bollards. Includes excavation, subgrade preparation, fixed or knock down bollard, concrete placement and finishing, tooled joints, curing, backfilling and compaction, and all related work. Measurement for payment will be a lump sum basis installed

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ADD Alt #1
Stormwater Grading. Includes excavation, subgrade preparation, raingarden mix placement, associated piping, sodding and finishing; hauling and disposal of excess excavation (if necessary); finish grading; clean up; and all related work. Measurement for payment will be on a lump sum basis

ADD Alt #2
East Parking Lot.
Concrete Curbing. Includes concrete (4000 psi min.) excavation, subgrade preparation, form work, fiber mesh reinforced concrete and accessories, expansion joints, concrete placement and finishing,

tooled joints, curing, backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for sidewalk construction. ***The parking lot curbing is the only curbing, curbing shown along 101st and Carterette is for coordination only.** Measurement for payment will be a lump sum basis

Asphaltic Paving. Includes excavation, subgrade preparation, asphaltic pavement, tack coatings, subgrade and fabric as detailed; placement and finishing, 4" striping shall be incidental to the pavement; backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for street construction. Measurement for payment will be a lump sum basis

ADD Alt #3
Sport Court. Includes excavation, subgrade preparation, concrete footing for hoop; asphaltic pavement, tack coatings, subgrade and fabric as detailed; placement and finishing; post hoop and backstop; 2" striping shall be incidental to the pavement (basketball only); backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for street construction. Measurement for payment will be a lump sum basis

ADD Alt #4
East Concrete Paving/Sidewalk. Includes concrete (4000 psi min) excavation, subgrade preparation, form work, fiber mesh reinforcement and accessories, expansion joints, concrete placement and finishing, tooled joints, curing, backfilling and compaction, restroom enclosure fencing and all related work. All work shall meet the City of Duluth standards for sidewalk construction. Measurement for payment will be a lump sum basis.

ADD Alt #5
Sport Court / Skating Structure. Includes shelter 24'x24' as drawn or pre-approved equal, shop drawings with structural signature (if not provided by supplier); excavation, subgrade preparation, form work, concrete foundation with rebar and conduit; concrete with fiber reinforcement and accessories, curing, striping, backfilling and compaction; light and electrical fixtures shall be incidental to the shelter; and all related work. Measurement for payment will be a lump sum basis.

ADD Alt #6
Dog Park Structure. Includes shelter 10'x10' as drawn or pre-approved equal, shop drawings with structural signature (if not provided by supplier); light and electrical fixtures shall be incidental to the shelter; excavation, subgrade preparation, form work, concrete foundation with rebar and conduit; concrete with fiber reinforcement and accessories, curing, striping, backfilling and compaction; and all related work. This item will only be accepted if Add Alt#7 is chosen. Measurement for payment will be a lump sum basis.

Add Alt #7
Dog Park Area Concrete Paving/Sidewalk. Includes concrete (4000 psi min) excavation, subgrade preparation, form work, fiber mesh reinforcement and accessories, expansion joints, concrete placement and finishing, tooled joints, curing, backfilling and compaction, and all related work. All work shall meet the City of Duluth standards for sidewalk construction; 6'-0" chain link fencing system. Contractor to include coordination with other chain link contractors as needed. Measurement for payment shall be incidental to the project. Measurement for payment will be a lump sum basis

END OF SECTION

SECTION 02100
SITE PREPARATION

PART 1 - GENERAL

1.01 SCOPE:

A. INCLUDED: Work included in this spec section generally includes all materials, labor, equipment, and incidentals for the completion of work shown on the Drawings, Specification and/or otherwise required herein.

B. Site preparation includes but is not limited to existing survey, examination of site, marshaling and access, construction layout, clearing, grubbing, topsoil stockpiling, erosion control, dust control, site protection and protection of all site elements remaining.

1.02 RELATED: General Requirements Division One of this Project Manual governs and is hereby made a part of this section.

A. FINISH GRADING is Spec SECTION 02210.

PART 2 - PRODUCTS

2.01 NOT APPLICABLE - Products do not apply to this Section of the work.

PART 3 - EXECUTION

3.01 EXAMINATION OF THE SITE: The Contractor shall visit, inspect and thoroughly familiarize himself with the site and with the scope of work to be done under his Contract.

3.02 ACCESS: The Contractor shall meet with the Owner's Representative to determine the point of access and areas to be utilized in executing the work. The Contractor shall limit his access to the job site to approved areas.

3.03 PREPARATION: Before commencement of any excavation operations this contractor shall remove from the site organic material, trash and debris, to the extent existing on the construction areas; however, payment request(s) will not be recognized for unauthorized clearing and grubbing in or outside of the construction limits defined on the Drawings.

3.04 CONSTRUCTION LAYOUT:

A. Contractor shall refer to Construction Documents for all layout work. This includes but is not limited to sidewalks, railings, gates, and site furnishings.

B. The Contractor shall establish and record all necessary boundary points, lines, elevation, grades and bench marks on site for proper control, coordination with subcontractors and execution of the work. The Contractor or his surveyor shall verify all furnished survey and topographic data and all points, lines and elevations, including elevations at the bases of existing trees which are to remain; the Contractor shall notify the Owner's Representative of any discrepancies between information given on drawings and actual site or field condition and shall not proceed with any affected work until the Owner's Representative issues instructions.

3.05 TOPSOIL: Topsoil is defined as friable loam surface soil found to a depth approximating 4". Satisfactory topsoil is reasonably free of subsoil, lumps, stones and other objects over 1" in diameter; without weeds, roots, other objectionable material. Landscape Architect to approve the topsoil to be reused.

A. STRIPPING: Unless otherwise recommended in Soil Report, strip topsoil, if existing, from area(s) to be graded, to whatever depths encountered in manner to prevent intermingling with underlying subsoil or other objectionable material.

B. STOCKPILING: Stockpile topsoil in storage piles in on-site areas where directed by the Owner's Representative, for use in sod and planting areas. Construct storage piles to freely drain surface water.

Prevent / contain erosion from water by covering and erection of silt fencing around stock piles. Cover storage piles if required to prevent windblown dust.

3.06 JOB SITE CONDITIONS:

A. WORK BY OTHERS: Primary electric, gas and telephone service is normally provided by the local utility companies; however, contractor(s) involved with these particular services shall verify, coordinate and assume responsibility with local Utility Company or Department for provision of proper and adequate temporary and permanent utility service.

B. PROTECTION:

01. PEOPLE AND PROPERTIES: Contractor(s) shall, in accord with local laws and regulations, adequately protect persons and properties from being damaged by work of this contract. Contractor(s) shall provide proper and sufficient barricades for safety and protection of persons for this work and adjacent properties during and after work hours.

02. TREES AND SHRUBS: Existing trees and shrubs to remain or to be relocated shall be protected from operations related to site construction work.

a. Trees to remain are to be protected with approved fencing. Fencing for both deciduous and evergreen trees to include all areas within the drip lines.

b. Areas within the drip line of existing or relocated trees shall not have any stockpiling of materials, equipment or machinery. Grading shall not be allowed unless indicated on plans; nor will the passage of equipment such as trucks, compressors or heavy wheel driven machinery be allowed.

c. Damage & Repair - Retained trees or shrubs that are damaged or disturbed shall be immediately repaired or replaced if necessary by and at cost to the party responsible for the damage.

C . DUST CONTROL: Work of this contract includes dust control as required for alleviation or prevention of dust nuisance on or about the site. Contractor(s) shall assume all liability, including court costs of codefendants, for claims related to dust or windblown materials that are attributable to this work.

D. DRAINING: Contractor(s) shall provide for surface drainage during construction period in manner to avoid creating a nuisance to adjacent areas. Excavations, pits, trenches and sub-grade area(s) shall be kept free of water during entire progress of the work by providing and operating pumps or other equipment necessary to drain. Water shall not be discharged onto adjacent public or private properties without written permission from adjacent property owner(s).

E. CLEANUP shall be in accord with the General Conditions and Requirements.

01. ROADWAYS: Public or private ways, highways, roads, streets, alleys, drives, parking areas used as access or egress to or from the site shall be kept free from materials falling from trucks or carried to such ways on tires. Cleaning of roadways shall be done promptly and to satisfaction of Owner's Representative and public or private authority having jurisdiction.

END OF SECTION

SECTION 02150
AGGREGATE BASE

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 and equipment necessary to furnish place and compact aggregate base for exterior pavement structures where shown on drawings and specified herein.

C. Related Work Specified Elsewhere:
   1. Site Preparation - Section 02100
   2. Concrete Flatwork - Section 02520

1.02 SUBMITTALS

A. TESTS: The following tests shall be made by an independent testing laboratory. The Contractor shall pay for all tests. One set of the following tests shall be performed during construction of the Aggregate Base Course:
   1. Gradation.....……. ASTM C136-76 and C117-76
   2. Abrasion.....……. ASTM C131-76
   3. Spall Material.....……. ASTM C123-69
   4. Standard Proctor Density.……. ASTM D698

Field density tests shall be made in conformance with ASTM D1556-64. Test compaction of base course at locations not more than 50 feet on center.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aggregate shall conform to MnDOT Section 2211, Aggregate Base (or approved equal) using Class 5 aggregate.

PART 3 - EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Coordinate with work under other Sections to confirm prepared subgrade elevations and conditions prior to placing aggregate base.

B. Conform with MnDOT Section 2211, Aggregate Base, (or approved equal) to place compacted layers not more than 3" in compacted thickness; except that if vibratory or other approved types of special compacting equipment are used, the thickness of each layer may be increased to a maximum of 6". Base course under all walks and paving shall be 6" compacted thickness unless otherwise noted on drawings.

C. Compact the full thickness of each layer of aggregate base to 100% of maximum density. Compaction tests are described in Article 1.02 above.

END OF SECTION

SECTION 02210
FINISH GRADING

PART 1 - GENERAL

1.01 INCLUDED: Work of this Spec Section generally includes finish grading for sodded or otherwise planted areas.

1.02 RELATED: General and Supplemental Conditions and all of Division One Sections govern and are hereby made a part of all work of this Section.
- A. SITE PREPARATION: Spec SECTION 02100.
- B. SODDING: Spec SECTION 02934.
- C. TOPSOIL: Spec SECTION 02910

1.03. JOB CONDITIONS:
- A. Examine the site, determine the nature of conditions to be encountered and accept the site as found upon the examination.
- B. PROTECTION:
  - 01. Carefully maintain and protect all bench marks, corner monuments and other points; if disturbed or destroyed, replace as directed and at the Contractor's expense.
  - 02. Report to the Owner's Representative any underground utilities which may be encountered.
  - 03. Provide for surface drainage during construction.
  - 04. Appropriate protective measures shall be taken to reduce dust, noise and damage.
  - 05. Have all utility lines and appurtenances located by the utility companies prior to beginning work.
  - 06. Coordinate with the Owner's Representative on earthwork sequencing and operations. Give advance notification to other contractors, utility companies and the Owner's Representative when doing work that affects their operations.
  - 07. All existing pavements, utilities, vegetation and structures to remain shall be protected at all times. Any damage caused by the Contractor shall be reported to the Owner's Representative. The damaged item or items shall be repaired or removed at the expense of the Contractor and shall be approved by the Owner's Representative.
  - 08. Maintain clean pavement for all adjacent parking lots, sidewalks and roads during entire project.

PART 2 - PRODUCTS

2.01 NOT APPLICABLE: Products do not apply to this Section of the work.

PART 3 - EXECUTION

3.01 GRADING:
- A. The Contractor shall do all finish grading on site in all planting areas as indicated on Drawings. Where no elevations are provided on the Drawings, the Contractor shall match the existing grade.
- B. Excavated and filled sections and adjacent transition areas shall be reasonably smooth, compacted and free from irregular surface changes.
- C. Obtain Owner's Representative's approval of the subgrade before commencing further improvements. Tolerances shall not exceed 3/4" above or below desired subgrade elevations in all areas to be graded.

END OF SECTION

SECTION 02315
EXCAVATION & BACKFILL

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 shall include furnishing all labor, material and equipment necessary to do all excavating and backfilling for the building, and do any work related to the earthwork construction.
C. Related Work Specified Elsewhere:
   01. Site Preparation - Section 02100
   02. Aggregate Base - Section 02150
   03. Bituminous Paving - Section 02512
   04. Concrete Flatwork, Paving - Section 02520
   05. Subsurface Drainage - Section 02620
   06. Topsoil - Section 02910
D. All trenching and other miscellaneous excavation designated under other sections of these specifications shall be in accordance with this section.
E. Unit Prices - Contractor shall state in the appropriate spaces on the Bid Form, Unit Prices for the following items as defined herein:
   01. Rock Excavation - per cubic yard.
   02. Granular fill under floor slabs and footings - per cubic yard.
   03. Mass Excavation - per cubic yard.
   04. Hand Excavation - per cubic yard.

1.02 DEFINITIONS

A. Rock - Is defined as stone or hard shale in original ledge, boulders 2 cu. yd. in volume or greater, masonry or concrete that cannot be broken and removed by normal job equipment without the use of explosives and drills. This classification does not include materials such as loose rock, concrete or other materials that can not be removed by means other than drilling and blasting and wedging, but which, for reasons of economy in excavating, the Contractor prefers to remove by drilling or blasting.
B. Earth : Material to be excavated that can be removed by hand shoveling, power shovel, bulldozer or other normal equipment but not requiring the use of drills shall be defined as earth removal, mass excavation or hand excavation.

1.03 TESTING

A. Owner shall hire and pay an independent testing laboratory to verify soil conditions and do compaction tests on all backfill materials.
B. This contractor shall cooperate with testing laboratory in developing a testing schedule.

1.04 UTILITIES

A. Rules and regulations governing the respective utilities shall be observed in executing all work under this Section.
B. Active utilities shown on the drawings shall be adequately protected from damage and removed and relocated only as indicated or specified. Where active utilities are encountered but are not shown on the drawings, the County/Owners Representative shall be advised; the work shall be adequately protected, supported or relocated as directed by the County/Owners Representative; the contract price will be adjusted for such additional work.

C. This contractor shall contact the local governing utility for assistance in locating utilities.

D. If you are doing any digging, state law requires you to notify Diggers Hotline of your intent to work, and to contact them at least three working days in advance.

To notify of your intent to dig:

- Call **811** or
- Visit Diggers Hotline (800)-242-8511 or (262)-432-7910
- Hearing Impaired (TDD) call 800-542-2289

PART 2 - PRODUCTS

2.01 FILL OUTSIDE THE BUILDING

A. Exterior backfill material shall be excavated material free from concrete, brick, broken masonry, stone, rock, wood, clay lumps, frozen earth, soft and unstable material which does not compact readily by tamping and rolling.
B. Additional fill required to bring up to design grades shall be furnished under this contract. Fill shall meet the requirements set forth in the above paragraphs.

2.02 FILL AT DRAINTILE

A. Pea Rock - Shall be a uniform grade of 3/8" diameter rocks.

2.03 COMPACTION CRITERIA

A. Compaction criteria for this construction shall meet the following based on ASTM D1557:

Sub-grade Fills:	Minimum Percent Compaction
Below Footings	95
Below Slabs-on-Grade	95
Below Pavements	95

Subbase Fills:

Below Footings	95
Below Slabs-on-Grade	95
Below Pavements	95
Aggregate Base Course (MDOT 22A or approved equal)	95
Non-Structural Fills	85

PART 3 - EXECUTION

3.01 EXCAVATION FLATWORK

A. Provide barricades, fences and protective devices as required for safety around all excavations.
B. Excavate all material of any nature to the lines and grades required by the drawings. Excavation shall be confined generally to the building lines allowing sufficient space for removal of form work, application of damp-proofing and similar foundation work.
C. Where concrete slabs are to be placed on grade, all loam organic material or other undesirable soil shall be removed to its full depth. In any case, soil shall be removed to a point at least six inches

below the bottom of the slab.

D. When excavations have reached the required depth, make at least 4 borings, 2 inches in diameter and 3 feet deep where directed. If material disclosed is satisfactory to Owners Representative, the holes shall be filled with concrete. If foundations require greater depth because of latent soil or other unusual conditions, adjustments will be made in the contract. No concrete shall be poured until soil at footing level has been examined and approved by the Owners Representative.
E. Roll proof the exposed material beneath the building, paved areas and walks using a tractor drawn vibratory compactor. Compaction shall be to 95% of the Modified Proctor Density beneath the building and 95% beneath paved areas and walks.
F. Protect bottom of excavation against freezing by means of blankets or straw as required. No fill or footings shall be placed over frozen ground and no frozen fill material shall be placed.

3.02 EXCAVATION RAINGARDEN

A. Provide barricades, fences and protective devices as required for safety around all excavations.
B. Excavate all material of any nature to the lines and grades required by the drawings. Excavation shall be confined generally to the building lines allowing sufficient space for removal of form work, application of damp-proofing and similar foundation work.
C. Where concrete slabs are to be placed on grade, all loam organic material or other undesirable soil shall be removed to its full depth. In any case, soil shall be removed to a point at least six inches below the bottom of the slab.
D. When excavations have reached the required depth, make at least 4 borings, 2 inches in diameter and 3 feet deep where directed. If material disclosed is satisfactory to Owners Representative, the holes shall be filled with concrete. If foundations require greater depth because of latent soil or other unusual conditions, adjustments will be made in the contract. No concrete shall be poured until soil at footing level has been examined and approved by the Owners Representative.
E. Roll proof the exposed material beneath the building, paved areas and walks using a tractor drawn vibratory compactor. Compaction shall be to 95% of the Modified Proctor Density beneath the building and 95% beneath paved areas and walks.
F. Protect bottom of excavation against freezing by means of blankets or straw as required. No fill or footings shall be placed over frozen ground and no frozen fill material shall be placed.

3.03 ROCK EXCAVATION

A. Material to be excavated is assumed to be earth and other materials that can be removed by power shovel, bulldozer or other normal equipment to excavation work, but not requiring the use of explosives or drills. If rock, as herein defined, is encountered within the limits of excavation, the contract price will be adjusted. When the rock is encountered, the Contractor shall immediately notify the Owners Representative and shall not proceed further until instructions are given and measurements made for the purpose of establishing volume of rock excavation.
B. Before placing concrete or masonry on rock surfaces, the surfaces shall be leveled off or shelved to a slope not exceeding 1" per foot.
C. Payment for rock excavation, as defined above, shall be at the agreed unit price per cu. yd. Final computations will be made in a vertical plane from the lowest point from which rock is excavated.

3.04 PUMPING

A. This Contractor shall provide and operate all pumping equipment necessary to maintain dry conditions. Pumps shall be operated as necessary to keep footing excavations dry until after footings have been poured. Operate pumps as necessary to keep excavated spaces clear of water during construction.

3.05 FILL OUTSIDE THE BUILDING AREA

A. Excavated material that is clean granular material free of contaminates, organic matter or other materials specified to be removed in Section 02100 may be used for backfill.
B. Any excavated material may be used for backfilling and for berms. Compaction to be 95% standard proctor.

3.06 ROUGH GRADING

A. Rough grading shall be a reasonably smooth surface approximately six inches below final grade. If sufficient material is not available at the site to raise grades to the contours shown, additional fill material shall be brought in. Fill material shall be sand or clean earth. Grade shall be sloped in such a manner that will insure drainage away from the building at all points.
B. Grading shall be done to grade stakes placed not less than 50 feet on center each way over the area to be graded. After fill and backfill have settled fill in shallow areas to bring them to the proper grade.

3.07 FINISH GRADING

A. Surface tolerances, uniformly smooth grading shall be accomplished on all areas, including excavated and fill sections and adjacent transition areas. The finished surface shall be reasonably smooth, compacted and free from all building debris and rubbish. The degree of finish shall be that ordinarily obtainable from blade-grade operations, except as otherwise specified. The finished surface shall be not more than 0.10 foot above or below the established grade or approved cross section. All ditches and gutters shall be finished so as to drain readily. The surface of areas to be top soiled shall be finished so as to drain readily. The surface of areas to be top soiled shall be finished as to a smoothness suitable for the placing of 6" of topsoil. The surface of embankments or excavated areas on which pavement is to be placed shall not vary more than 0.50 foot from the established grade and approved cross section when tested with 10 foot straight-edge applied both parallel to and at right angles to the centerline of the area.
B. Protection: Protect newly graded areas from the actions of the elements. Any settlement or washing that occurs prior to acceptance of the work shall be repaired and grades reestablished to the required elevation and slopes. Fill to required subgrade levels any areas where settlement occurs.

3.08 SETTLEMENT

A. Fill and backfill shall be compacted sufficiently to prevent future settlement or displacement of lawns. Particular emphasis shall be directed to utility trenches or deep excavations. If settlement does occur within the one year guarantee period, contractor shall correct the settlement conditions including replacement of sidewalks and blacktopping at no expense to the Owner.

END OF SECTION

SECTION 02512
BITUMINOUS PAVING

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 bituminous paving and related work all in accordance with the drawings and specified herein.
C. Related Work Specified Elsewhere:
   01. Site Preparation - Section 02100
   02. Aggregate Base - Section 02150
   03. Excavation/Backfill – Section 02315
   04. Concrete Flatwork-Paving-Curbs - Section 02520

1.02 SYSTEM DESCRIPTION

A. Two courses of Bituminous Pavement (plant mixed) in repaired areas
B. One course of Bituminous Surface Course

1.03 QUALITY ASSURANCE

A. All work shall conform to requirements of the Minnesota Department of Transportation specifications (or approved equal).

1.04 SUBMITTALS

A. This contractor shall submit a preliminary design mix for approval by the County/Owners Representative, based on materials outlined in Article 2.01 below.
B. TESTS: The following tests shall be made by an independent testing laboratory. Tests shall be paid for by the contractor. One set of tests shall be performed for the Base Course and one set of tests on the Surface Course. Test set shall be as follows:
   01. Extraction of Bitumen…….ASTM D2172-75
   02. Gradation……....ASTM C136-76 and C117-76
   03. Field Density……...ASTM D1188-71 and D1559-76
   04. Thickness……Field Measurement

PART 2 - PRODUCTS

2.01 BITUMINOUS MATERIALS

A. Furnish and place plant mixed bituminous materials using Plant Mixed Bituminous Pavement and Asphalt concrete surface.
B. BASE COURSE: Conform to MnDOT (or approved equal) Spec. 2331, Type 61 Aggregate Class A or D, Non-wear Course graded per MnDOT (or approved equal) Spec. 3139. Bitumen for base course shall be asphalt cement, 85-100 penetration or 120-150 penetration. The exact bitumen content shall be as determined by the preliminary job mix formula within the range of 3.5 to 5.5% by weight of the total mixture. Base course shall be 2” in compacted thickness.
C. TACK COAT: Conform to MnDOT (or approved equal) Spec. 2357, Bituminous Tack Coat, RC liquid asphalt.
D. SURFACE COURSE: Conform to MnDOT (or approved equal) Spec. 2331, Type 61 Aggregate Class A or D, Wear-Course graded per MnDOT (or approved equal) Spec. 3139. Bitumen for the surface course shall be asphalt cement, 85-100 penetration. The exact bitumen content shall be as determined by the preliminary job mix formula within the range of 5-8% by weight of the total mixture. Surface course shall be 1” in thickness.

PART 3 - EXECUTION

3.01 INSTALLATION - BITUMINOUS

A. Bituminous surfacing shall not be placed until testing lab has approved aggregate base compaction.
B. Conform with MnDOT (or approved equal) Sections called for above and the following requirements:
   01. Compaction shall be complete and uniform over all bituminous surfaces. Ordinary compaction method may be used over each course uniformly compacting until there is no further evidence of consolidation, all roller marks are eliminated, and complete surface drainage is achieved. Roll to attain a uniformly tight and dense surface without voids, cracks, and similar Water traps.

END OF SECTION

SECTION 02520
CONCRETE FLATWORK, PAVING

PART 1 _ GENERAL

1.01 INCLUDED: Work of this Section generally includes provision of on-site concrete curbs, walks, ramps and paved seating and pedestrian plazas.

1.02 RELATED: General Requirements Division One of the Project Manual pertains to and is hereby made a part of the work of this Section.
- A. FORMWORK: Spec SECTION 03100.
- B. REINFORCING STEEL: Spec SECTION 03200.
- C. CONCRETE ACCESSORIES: Spec SECTION 03250.

1.03 QUALITY ASSURANCE: Materials, items, accessories, manufacturers, proprietary, are listed in Part 2 - PRODUCTS and Part 3 - EXECUTION of this Spec Section.
- A. TESTING AGENCY QUALIFICATION: Field testing, including taking of cylinders and cones, loading or coring if required, shall be by independent testing laboratory engaged by the contractor.

1.04 REFERENCES: Comply with requirements of manufacturer, codes, specifications, standards, cited in this Spec Section, except where more stringently shown or specified comply with construction documents.
- A. American Concrete Institute (ACI):
  - 01. ACI 211.1-77 Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete.
  - 02. ACI 301-84 Specifications for Structural Concrete for Buildings.
  - 03. ACI 302-69 Recommended Practice for Concrete Floor and Slab Construction.
  - 04. ACI 306R-88 Cold Weather Concreting.
  - 05. ACI 318-77 Building Code Requirements for Reinforced Concrete.
  - 06. ACI 305R-89 Hot Weather Concreting.
- B. American Society for Testing and Materials (ASTM):
  - 01. ASTM C31_69 (1980) Making and Curing Concrete Test Specimens in the Field.
  - 02. ASTM C33_81 Spec for Concrete Aggregates.
  - 03. ASTM C150_81 Spec for Portland Cement.
  - 04. ASTM C260_77 Spec for Air-Entraining Admixtures for Concrete.
  - 05. ASTM C309_81 Spec for Liquid Membrane-Forming Compounds for Curing Concrete.
  - 06. ASTM C494_80 Spec for Chemical Admixtures for Concrete.
  - 07. ASTM E329_77 Rec Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
- C. U.S.A. Federal Specifications (FS):
  - 01. FS TT-C-800A(2) 23 Jun 77, Curing Compound, Concrete, For New and Existing Surfaces.
- D. ADA Handbook for walks, ramps and curb ramps.
- E. Douglas County standards.

1.05 SUBMITTALS shall be made in compliance with 1.03.

1.06 CONCRETE HANDLING TIME: No more than 90 minutes shall be allowed to elapse between the time the concrete is loaded on the truck to the time that it is placed on site.

1.07 JOBSITE CONDITIONS
- A. ENVIRONMENTAL REQUIREMENTS:
  - 01. COLD WEATHER: When outside temperature is below 40°F (5°C) or likely to fall below 40°F during 24-hour period before or after placing, supplier and installer(s) shall employ equipment and means for heating materials and keeping materials from freezing. Frozen materials or materials containing ice shall not be used. Temperatures of separate materials when placed in mixer shall not exceed 140°F. Temperature of concrete when placed shall be above 40°F.
  - 02. HOT WEATHER: When outside ambient temperature is above 75°F or likely to rise above 75°F supplier and installer shall take precautions to prevent water evaporation and subsequent pre-

hardening of mixed materials.

03. INCLEMENT WEATHER: Protect completed in-place erected work from rain, hail, snow, freezing, blowing acts of nature. Maintain minimum temperature of 40°F around newly placed items for minimum 48-hours by use of supplementary heat, electric blankets or infrared lamps.

PART 2 - PRODUCTS

2.01 MATERIALS & ITEMS:

A. CONCRETE: Ready-mixed concrete, conforming to ASTM C94. Six sack mix (540 lbs) 4,000 p.s.i. at 28 days, 2" to 4" slump, air-entrained to 6% to 7% with no additional additives and no additional water added on site.

B. CEMENT: Six sack per cubic yard minimum, conforming to ASTM C150, Type I or II.

C. FINE AGGREGATE: Sand, natural or manufactured; well graded, clean, hard; conforming to ASTM C33; free from clay, loam, mica, sticks, organic matter, other impurities.

D. COARSE AGGREGATE: Same as fine aggregate except gravel or crushed stone, well graded 1/4" (6mm) to 1-1/2" (4cm) for caissons and footings; maximum 3/4" (2cm) for slabs, walls, other structural elements.

E. WATER: Fresh, clear, clean, free from oil, acid, chemicals, animal or vegetable matter, alkalies or other material(s) or impurities harmful to cement; potable, suitable for domestic consumption. If heated, 100°F (38°C) maximum. No water added to concrete on site.

F. PLASTICIZER: Master Builders POZZOLITH, Protex PDA, Sika PLASTIMENT, conforming to ASTM C494, retarded or normal formula as required by weather conditions and desired workability.

G. AIR-ENTRAINMENT: Protex, Master Builders, Sika, Gifford-Hill AEA, in foundations and exterior flatwork only, conforming to ASTM C260, controlled at 6% plus/minus 1% at installation.

H. ACCELERATORS: Calcium chloride or any other salt, salt-like or chloride-like admixture shall not be used in cast-in-place concrete work.

I. HARDENER-SEALER: Over exterior flatwork, and slabs-on-grade provide National Expansion Joint Co. TECHKOTE 1020, Symons CURE & SEAL, L&M DRESS & SEAL #18, one-coat clear concentrate conforming to ASTM C309 and FS TT-C-800; may also be used as curing agent for exterior concrete other than flatwork.

J. SLEEVES: Sleeves under paved areas shall be PVC Schedule 40 unless specified otherwise sized and located as shown on Drawings.

K. FIBROUS REINFORCING: "Fibermix" by Fibermesh Company of Chattanooga, TN, or pre-approved substitute.

01. Physical characteristics:
Specific Gravity: 0.91
Tensile Strength: 70 to 100 ksi
Fiber Lengths: ½ inch, 3/4 inch

PART 3 - EXECUTION

3.01 SCHEDULE OF CONCRETE MIXES:

A. Exterior Concrete Flatwork

01.	Compressive strength at 28 days	4,000 psi
02.	Minimum Cement	6 sacks
03.	Maximum aggregate size	3/4 inches
04.	Air Entrainment	5 to 7 percent
05.	Maximum Water Cement Ratio	0.50
06.	Fibrous Reinforcement	1.5 lb/cy

3.02 CONTROL & CONSTRUCTION JOINTS not shown or noted will be located and formed in accord with ACI 318, Spec SECTION 03250, this spec section and the drawings.

3.03 INSTALLATION:

A. DISTRIBUTION: Distribute concrete evenly in the forms to produce a homogeneous composition free of air pockets, honeycombs, pouring joints and other imperfections. Use mechanical vibrators operated by experienced personnel in walls only. Do not over-vibrate or drag vibrator to cause segregation of material. Place concrete in maximum 24" lifts; no drop greater than 36".

B. CURING: Cure on-site cast concrete finish work. Curing compound, if used, should be clear concentrate material.

C. PATCHING: Immediately after removing forms grout flush with Portland cement grout, 1 part cement to 4 parts sand, minor honeycombing in exposed to view walls and paving. Major honeycombing in exposed areas shall be cause for removal of section to nearest construction joint. In unexposed areas, honeycombing shall be removed to solid concrete and patched to insure structural requirements.

D. FINISHING: All surfaces of exposed concrete are to be finished to be approved by Owner's Representative. Do not use dry cement or mixture of dry cement and sand on any setting concrete surfaces to absorb moisture or stiffen mix. Do not trowel if free water is present. Do not add water to concrete on site. Do not overwork/over-trowel concrete so as to weaken surface layer and allow spalling after concrete has cured.

E. WALKS: Minimum 4" thick with fibrous reinforcing (except where otherwise noted on the Drawings), with expansion joints at intervals of approximately 25 ft. and tooled control joints at +/- 5'-0" intervals equal to width of walks or maximum 8ft. o.c. (space joints equally in run). Tool edges to rounded profile and finish as noted herein or shown on the Drawings. Pitch walks 1/4" per ft. for drainage unless otherwise indicated. 6x6x1.4x1.4 Welded Wire Mesh (WWM) to be used in all sidewalk areas.

F. RAMPS: Construct ramps similar to walks. Maximum allowable slope not to exceed 1 ft. vertical in 12 ft. horizontal, with maximum rise not to exceed 30" between level landings. Provide an 8" thickened edge along both sides of ramp as shown on the drawings for anchoring of metal hand railings.

G. CURBS: Construct to profiles indicated as shown in Drawings. Provide expansion joints at 30 ft. o.c. maximum.

H. JOINTS:

01. Expansion Joints: Construct expansion joints at spacing indicated or specified herein, at joints between concrete curbs and sidewalks, and joints between walls or paving and manholes or fixed structures. Form joints with ½" thick x full depth compressible filler material; form upper ½" of joints with removable plastic "void strip" where joints are to be sealed.

02. Sidewalk Joints: Divide sidewalk into sections by installing tooled dummy joints at intervals indicated on the Drawings. Joint dimensions shall be approximately 1/8" wide x 1/3 the concrete depth.

03. Provide bond break between concrete walk and building surfaces.

3.04 FINISHING, PROTECTION AND CURING

A. FINISHES: Unless otherwise indicated or noted on the Drawings, provide the following finishes on concrete flatwork and paving:

01. Walks: Medium broom, non-slip finish, with uniform striations perpendicular to long dimension of walk or ramp.

02. Paving: medium broom, non-skid finish, with striations in opposite directions in alternate panels defined by expansion or control joints.

03. Curbs: Medium broom or brush finish, perpendicular to long dimension.

04. Ramps: Heavy broom non-slip finish,

05. Steps: Heavy broom non-slip finish, perpendicular to long dimension.

06. Edges: Edge all outside edges of concrete sidewalks, paving and other flatwork with a 1/5" radius edging tool.

B. PROTECTION:

01. Provide barricades or other suitable barriers to prevent pedestrian or vehicular traffic until concrete has sufficiently hardened.

02. Remove and replace flatwork and other concrete work defaced by vandals, at no additional cost to the Owner.

C. CURING: Comply with applicable provisions of Section 03300.

3.05 CLEANUP shall be accomplished in accord with paragraph 1.32 of Spec SECTION 02100.

A. ROADWAYS & SITE - Concrete contractor(s) shall keep the site and public and private ways (streets and roads) used as access or egress from the site free from materials falling from concrete trucks or other vehicles associated with the work and carried to such ways on wheels, tires, cleats, etc. Cleaning of site and roadways shall be done promptly and to satisfaction of Owner's Representative and public or private authority having jurisdiction.

END OF SECTION

SECTION 02520
CONCRETE FLATWORK, PAVING

PART 1 _ GENERAL

1.01 INCLUDED: Work of this Section generally includes provision of on-site concrete curbs, walks, ramps and paved seating and pedestrian plazas.

1.02 RELATED: General Requirements Division One of the Project Manual pertains to and is hereby made a part of the work of this Section.
- A. FORMWORK: Spec SECTION 03100.
- B. REINFORCING STEEL: Spec SECTION 03200.
- C. CONCRETE ACCESSORIES: Spec SECTION 03250.

1.03 QUALITY ASSURANCE: Materials, items, accessories, manufacturers, proprietary, are listed in Part 2 - PRODUCTS and Part 3 - EXECUTION of this Spec Section.
- A. TESTING AGENCY QUALIFICATION: Field testing, including taking of cylinders and cones, loading or coring if required, shall be by independent testing laboratory engaged by the contractor.

1.04 REFERENCES: Comply with requirements of manufacturer, codes, specifications, standards, cited in this Spec Section, except where more stringently shown or specified comply with construction documents.
- A. American Concrete Institute (ACI):
  - 01. ACI 211.1-77 Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete.
  - 02. ACI 301-84 Specifications for Structural Concrete for Buildings.
  - 03. ACI 302-69 Recommended Practice for Concrete Floor and Slab Construction.
  - 04. ACI 306R-88 Cold Weather Concreting.
  - 05. ACI 318-77 Building Code Requirements for Reinforced Concrete.
  - 06. ACI 305R-89 Hot Weather Concreting.
- B. American Society for Testing and Materials (ASTM):
  - 01. ASTM C31_69 (1980) Making and Curing Concrete Test Specimens in the Field.
  - 02. ASTM C33_81 Spec for Concrete Aggregates.
  - 03. ASTM C150_81 Spec for Portland Cement.
  - 04. ASTM C260_77 Spec for Air-Entraining Admixtures for Concrete.
  - 05. ASTM C309_81 Spec for Liquid Membrane-Forming Compounds for Curing Concrete.
  - 06. ASTM C494_80 Spec for Chemical Admixtures for Concrete.
  - 07. ASTM E329_77 Rec Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
- C. U.S.A. Federal Specifications (FS):
  - 01. FS TT-C-800A(2) 23 Jun 77, Curing Compound, Concrete, For New and Existing Surfaces.
- D. ADA Handbook for walks, ramps and curb ramps.
- E. Douglas County standards.

1.05 SUBMITTALS shall be made in compliance with 1.03.

1.06 CONCRETE HANDLING TIME: No more than 90 minutes shall be allowed to elapse between the time the concrete is loaded on the truck to the time that it is placed on site.

1.07 JOBSITE CONDITIONS
- A. ENVIRONMENTAL REQUIREMENTS:
  - 01. COLD WEATHER: When outside temperature is below 40°F (5°C) or likely to fall below 40°F during 24-hour period before or after placing, supplier and installer(s) shall employ equipment and means for heating materials and keeping materials from freezing. Frozen materials or materials containing ice shall not be used. Temperatures of separate materials when placed in mixer shall not exceed 140°F. Temperature of concrete when placed shall be above 40°F.
  - 02. HOT WEATHER: When outside ambient temperature is above 75°F or likely to rise above 75°F supplier and installer shall take precautions to prevent water evaporation and subsequent pre-

hardening of mixed materials.

03. INCLEMENT WEATHER: Protect completed in-place erected work from rain, hail, snow, freezing, blowing acts of nature. Maintain minimum temperature of 40°F around newly placed items for minimum 48-hours by use of supplementary heat, electric blankets or infrared lamps.

PART 2 - PRODUCTS

2.01 MATERIALS & ITEMS:

A. CONCRETE: Ready-mixed concrete, conforming to ASTM C94. Six sack mix (540 lbs) 4,000 p.s.i. at 28 days, 2" to 4" slump, air-entrained to 6% to 7% with no additional additives and no additional water added on site.

B. CEMENT: Six sack per cubic yard minimum, conforming to ASTM C150, Type I or II.

C. FINE AGGREGATE: Sand, natural or manufactured; well graded, clean, hard; conforming to ASTM C33; free from clay, loam, mica, sticks, organic matter, other impurities.

D. COARSE AGGREGATE: Same as fine aggregate except gravel or crushed stone, well graded 1/4" (6mm) to 1-1/2" (4cm) for caissons and footings; maximum 3/4" (2cm) for slabs, walls, other structural elements.

E. WATER: Fresh, clear, clean, free from oil, acid, chemicals, animal or vegetable matter, alkalies or other material(s) or impurities harmful to cement; potable, suitable for domestic consumption. If heated, 100°F (38°C) maximum. No water added to concrete on site.

F. PLASTICIZER: Master Builders POZZOLITH, Protex PDA, Sika PLASTIMENT, conforming to ASTM C494, retarded or normal formula as required by weather conditions and desired workability.

G. AIR-ENTRAINMENT: Protex, Master Builders, Sika, Gifford-Hill AEA, in foundations and exterior flatwork only, conforming to ASTM C260, controlled at 6% plus/minus 1% at installation.

H. ACCELERATORS: Calcium chloride or any other salt, salt-like or chloride-like admixture shall not be used in cast-in-place concrete work.

I. HARDENER-SEALER: Over exterior flatwork, and slabs-on-grade provide National Expansion Joint Co. TECHKOTE 1020, Symons CURE & SEAL, L&M DRESS & SEAL #18, one-coat clear concentrate conforming to ASTM C309 and FS TT-C-800; may also be used as curing agent for exterior concrete other than flatwork.

J. SLEEVES: Sleeves under paved areas shall be PVC Schedule 40 unless specified otherwise sized and located as shown on Drawings.

K. FIBROUS REINFORCING: "Fibermix" by Fibermesh Company of Chattanooga, TN, or pre-approved substitute.

01. Physical characteristics:
Specific Gravity: 0.91
Tensile Strength: 70 to 100 ksi
Fiber Lengths: ½ inch, 3/4 inch

PART 3 - EXECUTION

3.01 SCHEDULE OF CONCRETE MIXES:

A. Exterior Concrete Flatwork

01.	Compressive strength at 28 days	4,000 psi
02.	Minimum Cement	6 sacks
03.	Maximum aggregate size	3/4 inches
04.	Air Entrainment	5 to 7 percent
05.	Maximum Water Cement Ratio	0.50
06.	Fibrous Reinforcement	1.5 lb/cy

3.02 CONTROL & CONSTRUCTION JOINTS not shown or noted will be located and formed in accord with ACI 318, Spec SECTION 03250, this spec section and the drawings.

3.03 INSTALLATION:

A. DISTRIBUTION: Distribute concrete evenly in the forms to produce a homogeneous composition free of air pockets, honeycombs, pouring joints and other imperfections. Use mechanical vibrators operated by experienced personnel in walls only. Do not over-vibrate or drag vibrator to cause segregation of material. Place concrete in maximum 24" lifts; no drop greater than 36".

B. CURING: Cure on-site cast concrete finish work. Curing compound, if used, should be clear concentrate material.

C. PATCHING: Immediately after removing forms grout flush with Portland cement grout, 1 part cement to 4 parts sand, minor honeycombing in exposed to view walls and paving. Major honeycombing in exposed areas shall be cause for removal of section to nearest construction joint. In unexposed areas, honeycombing shall be removed to solid concrete and patched to insure structural requirements.

D. FINISHING: All surfaces of exposed concrete are to be finished to be approved by Owner's Representative. Do not use dry cement or mixture of dry cement and sand on any setting concrete surfaces to absorb moisture or stiffen mix. Do not trowel if free water is present. Do not add water to concrete on site. Do not overwork/over-trowel concrete so as to weaken surface layer and allow spalling after concrete has cured.

E. WALKS: Minimum 6" thick with fibrous reinforcing (except where otherwise noted on the Drawings), with expansion joints at intervals of approximately 25 ft. and tooled control joints at +/- 5'-0" intervals equal to width of walks or maximum 8ft. o.c. (space joints equally in run). Tool edges to rounded profile and finish as noted herein or shown on the Drawings. Pitch walks 1/4" per ft. for drainage unless otherwise indicated. 6x6x1.4x1.4 Welded Wire Mesh (WWM) to be used in all sidewalk areas.

F. RAMPS: Construct ramps similar to walks. Maximum allowable slope not to exceed 1 ft. vertical in 12 ft. horizontal, with maximum rise not to exceed 30" between level landings. Provide an 8" thickened edge along both sides of ramp as shown on the drawings for anchoring of metal hand railings.

G. CURBS: Construct to profiles indicated as shown in Drawings. Provide expansion joints at 30 ft. o.c. maximum.

H. JOINTS:

01. Expansion Joints: Construct expansion joints at spacing indicated or specified herein, at joints between concrete curbs and sidewalks, and joints between walls or paving and manholes or fixed structures. Form joints with ½" thick x full depth compressible filler material; form upper ½" of joints with removable plastic "void strip" where joints are to be sealed.

02. Sidewalk Joints: Divide sidewalk into sections by installing tooled dummy joints at intervals indicated on the Drawings. Joint dimensions shall be approximately 1/8" wide x 1/3 the concrete depth.

03. Provide bond break between concrete walk and building surfaces.

3.04 FINISHING, PROTECTION AND CURING

A. FINISHES: Unless otherwise indicated or noted on the Drawings, provide the following finishes on concrete flatwork and paving:

01. Walks: Medium broom, non-slip finish, with uniform striations perpendicular to long dimension of walk or ramp.

02. Paving: medium broom, non-skid finish, with striations in opposite directions in alternate panels defined by expansion or control joints.

03. Curbs: Medium broom or brush finish, perpendicular to long dimension.

04. Ramps: Heavy broom non-slip finish,

05. Steps: Heavy broom non-slip finish, perpendicular to long dimension.

06. Edges: Edge all outside edges of concrete sidewalks, paving and other flatwork with a 1/5" radius edging tool.

B. PROTECTION:

01. Provide barricades or other suitable barriers to prevent pedestrian or vehicular traffic until concrete has sufficiently hardened.

02. Remove and replace flatwork and other concrete work defaced by vandals, at no additional cost to the Owner.

C. CURING: Comply with applicable provisions of Section 03300.

3.05 CLEANUP shall be accomplished in accord with paragraph 1.32 of Spec SECTION 02100.

A. ROADWAYS & SITE - Concrete contractor(s) shall keep the site and public and private ways (streets and roads) used as access or egress from the site free from materials falling from concrete trucks or other vehicles associated with the work and carried to such ways on wheels, tires, cleats, etc. Cleaning of site and roadways shall be done promptly and to satisfaction of Owner's Representative and public or private authority having jurisdiction.

END OF SECTION

SECTION 02620
SUBSURFACE DRAINAGE

PART 1 - GENERAL

1.01SCOPE 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 drain pipe, as indicated in accordance with the drawings and the specifications, for a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Gravel, pearock, and fill material, See Section 02315 Excavation & Backfilling.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Draintile - 4" diameter corrugated polyethylene, perforated tubing with integral polypropylene protective fabric wrap, conforming to ASTM F405, as manufactured by Advanced Drainage System Inc., ADS-Green Stripe Drain Guard 4" No. 472 or equal.
B. Draintile Accessories - Provide all couplings, elbows and tees required to install new draintile to existing draintile shown on drawings. Accessories shall be from same manufacturer as draintile.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install draintile according to manufacturer's instructions. Connect draintile to existing draintile as shown on drawings. Provide an evenly sloping grade from existing draintile high point to low point and make a secure connection with existing.
B. Provide a 2" minimum bed of gravel below draintile at the necessary elevations.

END OF SECTION

SECTION 02810
IRRIGATION SYSTEM

PART 1 - DESCRIPTION OF WORK

1. Limits of underground irrigation system to be within the right of way of 101st and within the park both Phase I and Phase II.
2. Work includes design and installation of underground irrigation system for project site.

PART 2 - QUALITY ASSURANCE

1. Subcontract irrigation work to a single firm specializing in irrigation work and having a minimum of five years of experience with projects of similar size and scope.
2. Manufacturers Qualifications: Provide underground irrigation system as a complete unit produced by a single acceptable manufacturer, including heads, valves, controls and accessories.

PART 3 - PERMITS, LICENSES AND INSPECTIONS

1. Contractor is responsible for obtaining all permits and licenses required for installation to comply with all local and state laws and ordinances. Payment of related fees incident to obtaining necessary permits, licenses and inspections shall be by this contractor.

PART 4 - SUBMITTALS

1. Product: Submit manufacturer's technical data and installation instructions for underground sprinkler system.
2. Shop Drawings: Submit shop drawings for underground irrigation system including plan layout and details illustrating location ant type of heads, valves, piping circuits, controls, controller, backflow preventer and meter enclosure and accessories. Include design calculations for operation of system.
3. Record Drawings: Following completion and acceptance of installation, contractor shall furnish "as-built" drawings showing all sprinkler heads, valves, drains, and pipe line locations and depths to scale where required. Provide drawings on reproducible mylar stock and in an dwg format.
4. Operating Manuals/Instructions: Submit four operating manuals covering he complete system and instruct city representatives on the correct operation of the system.

PART 5 - ACCEPTABLE MANUFACTURERS

1. Manufacturer: Subject to compliance with requirements, provide products by the following: The Toro Company, Irrigation Division or Approved Substitute.

PART 6 - MATERIALS

1. Pressure Pipe: Comply with following for interior of above grade piping:
    a. 80 mm and larger, galvanized steel pipe, ASTM A 120, Schedule 40.
    b. Under 80mm, galvanized steel pipe, ASTM A120, Schedule 40, or seamless copper water tube, ASTM B88, Type "K", drawn temper.

2. Comply with the following for exterior below-grade piping:
    a. PVC Plastic Pipe: ANSI / ASTM A120, Class 160, Schedule 40.
    b. Galvanized Steel Pipe: ANSI / ASTM A 120, Schedule 40.
    c. Polyethylene Pipe: Use for size 40 mm and less.

3. Provide one of the above at Contractor's option.

4. Circuit Pipe (downstream from circuit valves): Comply with following:
    a. Polyethylene plastic pipe, ASTM D 1785, Schedule 40.
    b. Galvanized steel pipe, ASTM A 120, Schedule 40.
    c. Seamless copper water tube, ASTM B88, Type "M", drawn temper.

5. Provide one of the above at Contractor's option.

6. Pipe Fittings: Comply with following:
    a. For PVC plastic pipe, ASTM D2466 stock fitting with ASTM D 2564 solvent cement.
    b. For galvanized steel pipe, ANSI B16.3 galvanized malleable-iron crewed fittings.
    c. For copper tubing, ANSI B16.22 wrought copper or cast brass, recessed solder joint type fittings.

7. Valves: Manufacturer's standard of type and size indicated and as follows:
    a. Provide cast bronze, unless otherwise indicated.
    b. Manual Circuit Valves: Globe valves.

8. Quick Coupling Valves: Manual valves, fitting of quick coupling key operation. Valves shall fully open with one-half turn of key.
    a. Furnish two quick coupling valve keys with handles and swivel end to fit 25mm threaded hose connection. Locate one quick coupling in behind the backstop and adjacent to the north of side of building.

9. Automatic Circuit Valves: Globe valves operated by low-power solenoid, normally closed, manual flow adjustment.

10. Backflow Preventer: Manufacturer's standard to suit sprinkler system and local plumbing codes and standards.

11. Sprinkler Heads: Manufacturer's standard unit designed to provide uniform coverage over entire area of spray at available water pressure, as follows:
    a. Shrubbery: Fixed pattern with screw-type flow adjustment.
    b. Pop-Up Spray: Fixed pattern with screw-type flow adjustment and stainless steel retraction spring.

12. Valve Box: As manufactured by Amtek or other as approved, and shall be 305mm or jumbo size for automating electric valves. Valve box shall be 10 inches round for quick coupling valves.

13. Drainage Backfill: cleaned gravel or crushed stone, graded form 76mm maximum to 19mm minimum.

14. Controller Enclosure:
    a. Weatherproof and vandal proof enclosure to contain irrigation equipment, work to include: a) a concrete base; b) metal cabinet; c) piping, backflow preventer, controller, water meter, blowout pipe, valves, fittings; d) electrical and water service connections, and other components necessary to construct the system complete in place as specified. Location of irrigation controller to be shown on plans 1) at in main utility room, contractor to coordinate all conduit into building.
        1. Concrete Base: Cast in place concrete base to support the weight and area requirements of the equipment and enclosure. All penetrations through the base shall be PVC sleeve the full depth of the concrete. All power and control wiring shall be installed in NEC, approved conduit, and all wiring shall be in accordance with NEC, state and local codes.
        2. Equipment Enclosure: Provide shop drawings for approval. The cabinet shall be primed with one coat of an industrial grade epoxy based primer and finished with two coats of an industrial grade epoxy based enamel paint. Paints used shall be approved by the project landscape Architect.
        3. Pipe and Fittings: Piping installed above the top of the concrete slab shall be type "K" hard drawn copper, solder joint, 95-5 solder and Number 50 flux. Unions provided for the installation shall be solder joint type. Provide Di-electric unions where copper pipe is connected to steel equipment.

PART 7 - AUTOMATIC CONTROL SYSTEM

1. General: Furnish low voltage system manufactured expressly for the control of automatic circuit valves of underground irrigation systems. Provide unit of capacity to suit number of circuits as indicated.
2. Transformer: To convert LINE service voltage to control voltage of 24 volts.
3. Controller: Toro 12 Station Vision II with rain sensor electromechanical controller.
4. Circuit Control: Each circuit variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each circuit.
5. Timing Device: Adjustable, 24 hour and 7 or 14 day clocks to operate any time of day and skip any day in a 7 or 14 day period.
   a. Allow for manual or semi-automatic operation without disturbing preset automatic operation.

PART 8 - SYSTEM DESIGN

1. Design Pressures: Indicate on shop drawings, at the connection to water source and at last head in circuit. Verify supply pressure with the City of Duluth Engineer.
2. Location of Heads: design to provide specified coverage of all planting and sodded areas. Make minor adjustments as necessary to avoid plantings and other obstructions. Locate heads to avoid overspray onto roadways, sidewalk paving, parking areas and signs.
3. Minimum Water Coverage:
   a. Planting areas, 95 percent minimum coverage.
   b. Turf areas, 100 percent.
   c. Seed areas, 50 percent. Accomplish by overspray and from turf area heads.
   d. Design system which places shrub beds and turf areas on separate zones.
4. Manual Shut Off: Locate manual shut off valve downstream of backflow preventer.
5. Manual Quick Coupler Valves: Locate one quick coupler valve in each median shrub bed.
6. Winterization: Design system to accommodate winterization by blowing system dry with compressed air.
7. Sleeves: Utilize sleeves for all walks, roadway paving, walls or foundations by piping or control wiring. Contractor is responsible for coordination of sleeve locations with General Contractor prior to construction. Payment for sleeving is incidental to irrigation system.

PART 9 - TRENCHING AND BACKFILLING

1. General: Excavate straight and true with bottom uniformly sloped to low points. Route 18 inches from back of curb where possible.
2. Trench Depth: Excavate trenches to a depth of 80 mm below invert of pipe, unless otherwise indicated.
3. Minimum Cover: Provide the following minimum cover over top of installed piping:
    a. Steel Piping, 300 mm
    b. Copper tubing, 300 mm
    c. PVC and polyethylene piping, 450 mm
    d. Control wiring, 450 mm.
4. Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 25 mm diameter. Place acceptable backfill material in 125 mm lifts, compacting each lift.
5. Backfill trench to within 150 mm of finished grade. Continue fill with acceptable topsoil and compact to bring sod even with existing lawn.
6. Replant sod within three days after removal, roll and water generously.
7. Resod and restore to original condition any sod areas not in healthy condition equal to adjoining lawns 30 days after replanting.
8. Excavate trench to required depth and width.
9. At walkways, jack piping under paving material if possible.
10. Backfill with dry sand material, placing in 150 mm lifts.

PART 10 - INSTALLATION

1. General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code. The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the proper and lawful prosecution of the work. They shall also obtain and supply the Owner with all certificates required to show the work has been performed in accordance with the plumbing, electrical, and other codes, rules and regulations of local or other authorities.
2. Irrigation contractor is responsible for all wiring at controller locations.
3. Construction Coordination: Location of all existing and proposed underground utilities, irrigation lines, structures and plantings shall be the responsibility of this Contractor. Any damages occurring due to irrigation installation shall be repaired or replaced to the satisfaction of the Project Landscape Architect at the expense of the Contractor.
4. Connection to Mainline: Connect to main water source located within the proposed building. Coordinate with the architect/utility contractor on location of connection point.
5. Maintain uninterrupted water service to buildings during normal working hours. Arrange for any temporary water shut off with City.

6. Backflow Preventer: Provide valve and union on downstream side. Install minimum 150 mm above highest ground level sprinkler head.
7. Water Hammer Arrester: Install between connection to main and circuit valves, in a valve box.
8. Circuit Valves: Install in valve box, arranged for easy adjustment and removal.
    a. Provide union on downstream side for galvanized steel piping.
    b. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

9. Piping: Lay pipe on solid sub-base, uniformly sloped without humps or depressions.
    a. For circuit piping, avoid low points in pipe where water could collect during winterization of system.
    b. At all penetrations, pack the opening around pipe with non-shrink grout. At exterior face, leave a perimeter slot approximately 12 mm wide by 19 mm deep. Fill this slot with backer rod and an acceptable elastomeric sealant. Repair below grade waterproofing disturbed by this work and make penetration watertight.
    c. Install PVC in dry weather when temperature is above 40 degrees F (4 degrees C) in strict accordance with manufacturer's instructions. Allow joints to cure at least 24 hours at temperatures above 40 degrees F (4 degrees C) before testing, unless otherwise recommended by manufacturer.

10. Sprinkler Heads: Flush circuit lines with full head of water and install heads after hydrostatic test is completed.
    a. Install shrubbery and lawn heads at manufacturer's recommended heights.
    b. Locate part-circle heads to maintain a minimum distance of 100 mm from walls and 50 mm from other boundaries, unless otherwise indicated.

11. Dielectric Protection: Use dielectric fittings at connection where pipes of dissimilar metal are joined.

PART 11 - TESTING

1. General: Notify Landscape Architect in writing when testing will be conducted. Conduct tests in presence of Landscape Architect.
2. Hydrostatic Test: Test water piping and valves, before backfilling trenches, to a hydrostatic pressure of not less than 100 psi. Piping may be tested in sections to expedite work. Remove and repair piping, connections, valves which do not pass hydrostatic testing.
3. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place and sprinkler heads have been adjusted to final position.

a. Demonstrate to Landscape Architect that system meets coverage requirements and that automatic controls function properly.
b. Coverage requirements are based on operation of one circuit at a time.

4. After completion of grading, sodding and rolling of grass areas, carefully adjust lawn sprinkler heads so they will be flush with or not more than 10 mm above finished grade.

PART 12 - GUARANTEE

1. Contractor shall guarantee irrigation system for materials and workmanship for a period of one year from the date of acceptance. Contractor shall drain and winterize system in the fall following acceptance and shall put system back in service the following spring as part of the work of the contract at no additional cost to the Owner.

END OF SECTION

SECTION 02830
CHAINLINK FENCING

PART I - GENERAL

1.01 INCLUDED: Work of this section consists of furnishing all required labor, materials, equipment, and supplies necessary for the fencing in accordance with these specifications.

1.02 RELATED: General Requirements Division One of the Project Manual pertains to and is hereby made a part of the work of this Spec Section.

A. CAST IN PLACE CONCRETE is Spec SECTION 03300.

1.03 SUBMITTALS: Submit shop drawings of all gates, rail to post connections, fabric to rail and post connections, and fabricated fittings; samples of hinges, latches and fence fabric; and mill certificates for fabric and pipe to Owner's Representative for approval.

PART 2 - PRODUCTS

2.01 HEIGHT: Height of fence shall be as shown on the Drawings.

2.02 FABRIC: Shall be two inch (1 3/4") galvanized fabric shall have a polyvinyl chloride coating, minimum wall thickness of .015 inches over a galvanized substrait. GAW chainlink with a Class 1 zinc coat weight of 1.2 oz. per square foot (366 g/sq. m.) of un-coated wire surface, manufactured in accordance with ASTM A 392. Top and bottom selvage of the fabric shall be knuckled.

A. Nine gauge (9 Ga.). The base metal shall have a nominal coated wire diameter of 0.148" (3.7 mm) and a minimum breaking strength (N) of 1,290/lb.

2.03 PIPE AND ACCESSORIES:

A. METHODS OF MANUFACTURING: Base metal pipe used for fence framework shall be SS-40 weight, cold rolled and electric-resistance-welded from steel conforming to ASTM A-569 and hot dip galvanized to ASTM A-525 G-90 zinc weight both inside and outside the pipe.

B. POSTS:

01. All line posts shall be two and three-eighths inch outside diameter (2 3/8" O.D.) with a wall thickness of .120 (11 Ga.)

02. All terminal and gate posts shall be two and seven-eighths outside diameter (2 " O.D.)with a wall thickness of .160 (11 Ga.).

03. All pipe and accessories shall receive a galvanized coating. zinc phosphate pretreatment of galvanized steel.

C. RAILS: Rails shall be one and five-eighths inch outside diameter (1 " O.D.) pipe with a wall thickness of .133 (13 Ga.) and a minimum yield strength of fifty five thousand pounds per square inch (55,000 p.s.i.) and provided with seven inch (7") long expansion sleeve couplings.

D. ACCESSORIES:

01. Fabric Ties: Eleven gauge (11 Ga.) galvanized steel tie wire to fasten fabric to framework. Tension wire shall be attached to fabric bottom with heavy galvanized hog rings.

02. Tension Wire: Two (2) strands of twelve and a half gauge (12.5 Ga.) steel wire twisted together.

03. Tension Bands: Beveled edge type with nuts and bolts.

04. Line Post Tops: Heavy galvanized cast from eye top fitting.

05. Terminal, Gate and Backstop Post Tops: Heavy galvanized iron tops of bullet type construction sized for specified post.

.06 All accessories to galvanized coating.

E. GATES: Construct gate frames with one and seven-eighths inches outside diameter (1 " O.D.) rail material with a wall thickness of .120 with welded corners. Cross bracing at corners

shall be one and five-eighths inch (1 ") pipe with a wall thickness of .111, welded to the frame. Provide same fabric filler as used in fence, truss rods, roller assemblies with covers and heavy duty galvanized hardware with lockable latches and 180 degree industrial hinges.

F. CONCRETE: Concrete shall have twenty-eight (28) day, four thousand five hundred pounds per square inch (3,500 p.s.i.) compressive strength.

G. GATE LOCKS: Provided by Owner

PART 3 - EXECUTION

3.01 WORKMANSHIP: The complete fence shall be plumb, both in line and transverse to the fence, straight and rigid with fabric tightly stretched and held firmly in place. Details of construction not specified, shall be performed in keeping with standard good fencing practices.

3.02 POSTS: Space all posts not more than ten feet (10') apart and set in concrete thirty six inches (36") deep and not less than 12 inches (12") in diameter, unless otherwise noted on the Drawings.

3.03 RAILS: Install top, mid, bottom rails (and other rails as required) as shown on the Drawings. Set rails as nearly parallel to the finish grade as possible and at the specified height of the fence or backstop.

3.04 GATES: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage, as recommended by the fence manufacturer. Adjust hardware for smooth operation and lubricate where necessary.

END OF SECTION

SECTION 02841
RECREATION EQUIPMENT

1.0 DESCRIPTION OF WORK

Work covered by this specification concerns all labor, materials, and equipment necessary for installation of play equipment and resilient surfacing.

2.0 – MATERIALS

3.0 – EXECUTION

Installation in accordance with the manufacturer's recommendations.

SPECIFICATIONS PLAYGROUND EQUIPMENT

PLAY EQUIPMENT SPECIFICATIONS:

MATERIAL: All materials shall be structurally sound and suitable for safe play. Durability shall be insured on all steel parts by the use of time tested coatings such as zinc plating, powdercoating, P.V.C. coating, zinc-nickel plating, etc.

POLYESTER POWDER-COATING: All metal components to be powdercoated shall be free of excess weld and spatter. Parts shall then be thoroughly cleaned in a 6 stage pre-treatment system then thoroughly dried. Powdercoating shall be electrostatically applied and oven cured at 400 degrees. Average thickness shall be 4 Mils.

.

HOOP/UPRIGHT SPECIFICATIONS:

POSTS: 6" Square steel posts (2) with a 5'-0" offset, powder coated black, as provided by :

Model # 1577

Patterson Williams
140 N. Gilbert Road
Mesa, AZ 85203

Backboard: H.D. Cast Aluminum, fan(2) with a painted with target and perimeter, as provided by :

Model # 22 and Model #28

Patterson Williams
140 N. Gilbert Road
Mesa, AZ 85203

Goal: H.D. Double Rim, super chain goals(2), as provided by :

Model # 45

Patterson Williams
140 N. Gilbert Road
Mesa, AZ 85203

SPECIFICATIONS SPECIAL PROVISIONS

1. SCOPE

The Work covered by this Specifications consists of all materials and equipment and performing all operations as indicated in the drawings and as described herein.

2. OWNER

The Owner is the City of Duluth. The proposal administration, and project construction shall be overseen by the Owner.

3. PROJECT LOCATION

The equipment and improvements shall be furnished and/or installed at the Harrison Community Park, Duluth, Minnesota.

4. SPECIFICATION REFERENCE

The information provided in the Play Equipment Specification is derived from Earl F. Andersen, Inc. representing Landscape Structures, Inc. This specification reference is a basis of evaluation for all play equipment manufacturers providing equal or better products. The specification is in no manner priority of choice on behalf of the Owner.

5. DEVIATIONS FROM SPECIFICATION

All proposals shall indicate any and all deviations from the specifications. Deviations are considered but not limited to changes in materials, finish, function, engineering, configuration, aesthetics, and play experience. This submittal shall include all the play equipment in the proposal, and all other indicated equipment in this proposal. The information provided shall be at an equivalent level of detail as the general specification. Misrepresentation or omission may be grounds for rejection of the proposal. A drawing of the playground with equipment shown to scale must be submitted to show any and all deviations.

Please note that the Owner's selection of a Contractor will be based upon price, design of the plan, and the criteria outlined above.

6. SUBMITTAL REQUIREMENTS

Each of the following items shall be considered an integral part of the Bidder's Proposal and shall be submitted to the Owner on or before the Due Date and Time as stated on the Proposal Form:

A. The bidder shall indicate all deviations from the specifications.

7. REGULATORY COMPLIANCE

All equipment provided and all areas around and between equipment must comply with the most current Consumer Product Safety Commission (CPSC) guidelines and The American Society for Testing and Material (ASTM) standard. It is the responsibility of each bidder and manufacturer to be aware of these guidelines. Please list all deviations where you do not comply totally and explain each in detail when submitting the proposal. As recommended by CPSC, a project specific maintenance manual shall be provided at the end of the project.

8. DESCRIPTION OF THE PROJECT

The project for the purposes of this proposal is to include basketball equipment as indicated on the component list and specifications. The unit items shall include unit prices for equipment including taxes and shipping. It is

the responsibility of each bidder to develop and submit with their proposal, a layout design of the play equipment. The owner will not be providing a layout of the play equipment.

END OF SECTION

SECTION 02910
TOPSOIL

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, material and equipment necessary for furnishing and placing topsoil borrow over areas to receive future sod and plantings.

C. Related Work Specified Elsewhere:

1. Finish Grading: Spec SECTION 02210
2. Sodding: Spec SECTION 02934

1.02 SUBMITTALS

Submit 1/8 cubic foot sample of topsoil with test results for associated use to be used for Owners Representative approval prior to placing any topsoil.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Topsoil Borrow - conform with MnDOT (or approved equal) Section 3877 and as below, Topsoil Borrow for class A Topsoil to be used as a sports turf growing medium. Coordinate furnishing and placing with other operations.

	minimum	maximum
passing the No.10 Sieve	95%	na
Clay	5%	20%
Silt	25%	50%
Sand & Gravel	25%	60%
Organic Matter	15%	25%
PH	6.0	7.1

B. Note - If topsoil can be salvaged from the construction area, Landscape Architect shall be consulted for permission to use the topsoil.

C. Coordinate furnishing and placing with other operations.

01. CONTRACTOR shall provide following information:

a. TEST RESULTS showing mixture of composition and analysis.

b. LOADING TICKETS showing amounts of topsoil delivered to the site.

c. TESTS shall be by qualified soils laboratory, in accord with accepted soils amendments testing procedures, and shall be at Contractor expense.

PART 3 - EXECUTION

3.01 EXAMINATION OF SURFACES

A. Before starting any work under this section this contractor shall examine the areas that are to receive his materials and report any deficiencies to the Owners Representative in writing. Examination shall look for any irregular or settled subgrade surfaces, soft spots or settlements causing unsatisfactory surface drainage. Such deficient areas shall be corrected by the General Contractor before any work begins. Starting of any work by this contractor shall imply his acceptance of the surfaces as suitable to receive his materials.

3.02 INSTALLATION

A. Conform with

01. Conform to MnDOT (or approved equal) Section 2105, Finishing Operations for placing and finish grading topsoil.

02. Coordinate furnishing and placing with other operations.

03 Upon completion of rough grading, soil surface shall be loosened by rototilling to

minimum depth of 6", and materials over 1" in diameter/lenght shall be removed.

04. After completion of sub-grade preparation, place minimum 4” settled measure depth of topsoil over entire area unless otherwise noted. Smooth grade to within 3/4" of finish grade after settlement to eliminate irregularities and to match adjacent pavements and walks. Intermix topsoil with loosened sub-grade by means of a rototiller.

END OF SECTION

SECTION 02920
SOIL PREPARATION

PART 1 - GENERAL

1.01 INCLUDED - Work of this Spec Section generally includes provisions for soil preparations on areas to be sodded, or otherwise planted as part of earthwork operations.

1.02 RELATED - General and Supplemental Conditions and all of Division One Sections govern and are hereby made a part of the work of this Section.

A. FINISH GRADING: Spec SECTION 02210
B. TOPSOIL: Spec SECTION 02910
C. SODDING: Spec SECTION 02934.

1.03 DELIVERY/STORAGE/HANDLING - Deliver, unload, store, and handle materials and products in dry, weatherproof, waterproof condition in manner to prevent damage, breakage, deterioration, intrusion, ignition, or vandalism. Deliver materials and products in original unopened packaging containers prominently displaying manufacturer name, proprietary, volume, quantity, contents, instructions, conformance to local, state, and federal law. Remove and replace, at the Contractor's cost: cracked, broken, spoiled, or contaminated items; and corrosive elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire or jobsite damage.

A. SOIL AMENDMENT shall be delivered to site in bulk, measured on volume basis.
B. DELIVERY & INSPECTION - Notify Owner's Representative of delivery schedule in advance so material may be inspected upon arrival at jobsite. Unaccepted material shall be removed immediately from jobsite.

1.04 SUBMITTALS:

A. A sample of the proposed soil amendment shall be submitted to the Owner's Representative for approval.
B. Soil test results

PART 2 - PRODUCTS

2.01 SOIL AMENDMENTS:

A. CHEMICAL FERTILIZER – Fertilizer shall be in slow-release granular form.
   01. Contractor shall apply fertilizer in strict conformance with manufacturer’s instructions.
   02. Add fertilizer to topsoil and planting areas at a rate as recommended by the results of the required soil tests.
   03. Mix into topsoil or planting soil as instructed.
   04. Any fertilizer falling on paved areas shall be promptly cleaned up.
   05. Contractor shall clean up any spills immediately.

PART 3 - EXECUTION

3.01 PREPARATION & TILLING OF BLUEGRASS SOD AREAS - Upon completion of rough grading, soil surface shall be loosened by rototilling to minimum depth of 6", and materials over 1" in diameter shall be removed. Spread 4” topsoil evenly over sod area and mix thoroughly into soil surface to minimum depth of 6" by means of rototiller or soil mixer (rippers, discs, chisel plows, are not acceptable). After completion of soil loosening and mixing, spread chemical fertilizers evenly over surface at rate recommended by the soil test results and lightly mixed into soil surface. Surface shall then be finish graded to appropriate elevations and compaction. (Refer to SECTION 02930 for soil preparation in tree and shrub plantings.)

END OF SECTION

SECTION 02930
PLANT MATERIALS

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 furnishing all labor, materials and equipment necessary to place plant materials as shown on the drawings and specified herein.

C. Related work specified elsewhere:
   01. Topsoil - Section 02910

1.02 REFERENCE STANDARDS

A. Conform with MnDOT Section 3861, Plant Stock (or approved equivalent). Only planting zone 3 or 4 (University of Minnesota Extension Bulletin 267) will be accepted or approved equivalent.

B. Plant material shall conform to nomenclature of "Standardized Plant Names": as adopted by the Joint Committee of Horticulture Nomenclature, latest edition. Size and grading standards shall conform to the American Association of Nursery Stocks", latest edition. No substitutions of size or grade shall be permitted without written permission of the Architect. Each bundle of plants and all separate plants shall be properly identified with legible waterproof tags securely fastened to each plant or bundle of plants.

C. All plant material shipments and deliveries shall comply with State and Federal laws and regulations governing the inspection, shipping, selling and handling of plant stock. A tag or label bearing the name and address of the licensed dealer or nurseryman and a certification that the material is from an officially inspected source shall accompany each shipment or delivery of plant material.

1.03 QUALITY ASSURANCE

A. All plants shall be true to type. They shall have normal, well-developed branch systems and a vigorous fibrous root system. They shall be sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall be nursery grown unless otherwise indicated. They shall have been growing in similar climatic conditions as the location of the project for at least two years prior to the date of this contract.

B. All plants, including their roots, shall be free from disease, insects, or other injurious qualities. All local, state and federal laws pertaining to the inspection, sale and shipment of plant materials shall be complied with. The trunk bark of all trees shall be sound, trees shall have no large wounds, and any small wounds shall have a satisfactory callus roll formed or forming over them. Plants shall show good annual growth. Buds shall be plump and well filled for the species. Evergreen foliage shall be of good intense color.

1.04 DELIVERY, STORAGE AND HANDLING

A. Plant stock shall be furnished balled and burlapped (B & B) and shall be moved with a compact dug ball of earth so firmly wrapped in burlap that upon delivery the soil in the ball is still firm and compact about the small feeding roots. Each ball shall be of sufficient size to encompass all the fibrous feeding roots necessary to insure successful recovery and development of diameters, and increased ball sizes for collected stock shall be in accordance with Recommended Balling and Burlapping Specifications as set forth in the current edition of the American Standard for Nursery Stock sponsored by the American Association of Nurserymen, Inc.

1.05 SCHEDULING

A. The normal spring planting season for all plants shall extend to June 1. The normal fall planting season for all plants except evergreens shall begin on October 1. Fall evergreen planting shall be done between September 1, and October 1. Unless otherwise approved, planting shall not be done when the ground is frozen or when the soil is in an unsatisfactory condition for planting.

1.06 GUARANTEE

A. All plants shall be subject to the approval of the Owners Representative. All plants rejected at the project site shall be replaced with acceptable plants of the same species, variety and size unless otherwise directed by the

Owners Representative.

B. The Contractor shall guarantee all new plant materials through one spring growing season after acceptance by the Owners Representative. Plants accepted after October 1 shall be guaranteed until October 1 of the following year. If any plants die as a result of improper planting or related causes, they shall be replaced by this Contractor at no additional expense to the Owner. If any replacement plants die as a result of improper planting, they shall also be replaced by this Contractor at no additional expense to the owner.

C. All evergreens that die during the course of the plant establishment period shall be removed and disposed of by the contractor as their dead condition becomes evident. Fall plantings which fail to survive the winter dormancy period shall be replaced by the contractor during the following spring planting season and before beginning of the growing season.

D. Near the end of the first full growing season, but no later than the expiration of the plant establishment period, an inspection of the planting will be made and only those plants that are alive and normally healthy will be accepted. Unaccepted material shall be removed and replaced by the contractor, at his own expense, during the next planting season. Material and method of replacement planting shall be the same as specified for the original planting.

PART 2 - PRODUCTS

2.01 PLANT MATERIALS

A. Trees, shrubs and ground cover; description, size and quantity are shown in the plant list on the drawings. Plants supplied shall conform to MnDOT Section 3861 (or approved equivalent) and the following:

01. All plants shall be nursery grown stock that has been transplanted or root-trimmed two or more times according to the kind and size of plant.
02. All plants shall be typical of their species and have well formed tops and root systems and shall be free from injurious insects, plant diseases or other plant pests. Plants shall be hardy under the climatic conditions at the site.
03. Plants furnished shall be free from the following defects:
    a. Serious injuries to top, branches, trunk, bark or roots.
    b. Dried out roots.
    c. Prematurely opened buds.
    d. Thin or poor tops or root systems.
    e. Evidence of molding.
    f. Dry, loose or broken ball of earth in B & B stock.
04. Plant stock shall conform to the code of standards set forth in the current edition of American Standard for Nursery Stock recommended for general use and adoption by the American Association of Nurserymen, Inc.

2.02 MISCELLANEOUS ACCESSORIES

A. Mulch – See plans and details for mulch type and thickness required.

B. Fabric Weed Barrier - shall be a 4 oz. spunbonded non-woven polyester fabric, Mirafi, Inc. - Mirascape Landscape Fabric or approved equal. Provide sample to Owners Representative for approval.

C. Water - shall be free from any impurities or substances which might injure plants

D. Edging - Metal edging shall be 3/16" x 5-1/2" Steel edging - black in color from the manufacturer. Provide sample to Owners Representative for approval

2.03 PLANTING SOIL

A. Conform with MnDOT Section 3877 (or approved equivalent), Topsoil Borrow, for "select topsoil borrow" or approved equivalent.

PART 3 - EXECUTION

SECTION 02930
PLANT MATERIALS

3.01 PLANTING

A. Conform with MnDOT Section 2571 (or approved equivalent), Plant Installation, Place planting as follows:

01. Insofar as practicable, plant stock shall be planted on the day of delivery at the project site. In the event this is not possible, the plant stock shall be temporarily stored by "heeling-in" or by placing in a well ventilated, cool, moist storage place and shall be adequately protected against drying by the use of moist sphagnum moss, straw or other suitable covering around the roots of BR stock and the balls of B&B stock.
02. The plant hole shall be large enough to permit placing at least 6" or backfill material around the balls of B&B stock.
03. In the event it is necessary to suspend planting operations until the following planting season, any open plant holes shall be backfilled before suspending the work.
04. The bruised or broken parts or large or fleshy roots shall be cut off smoothly before planting or potting. The tops of deciduous plants shall be pruned either before or at the time of planting. This shall consist of removing dead and broken branches to compensate for root loss and to shape the plant. The pruning shall be done so that the plant retains its natural form. Except when heading back, all cuts shall be made flush with the trunk or branch. Evergreen plants shall not be pruned except to remove dead or broken branches. All cut surfaces one inch or more in diameter shall be painted with a tree wound dressing.
05. All planting shall be performed in accordance with the method herein provided, insofar as practicable.
06. The soil in the bottom of the hole, which has been excavated to the prescribed requirements, shall be loosened to a depth of 6" and mixed with an equal amount of topsoil. A mound of soil shall be formed in the center of the hole to support the roots or ball of the plant. The plant shall be placed on the mound of soil and held in a vertical position. Plants shall be placed in their wrapped ball, and shall be moved and hauled only by the ball.
07. The plant shall be so set, by adjusting the elevation of the mound, that after settlement the plant will stand at approximately the same depth it stood in the nursery or field.
08. The plant hole shall be backfilled with planting soil to which either peat moss or compost has been added at the ratio of six parts soil to one part by volume. The soil compost mixture shall be placed in layers around the ball. Each layer shall be carefully tamped in place in a manner to avoid injury to the ball or disturbing the position of the plant. When approximately two-thirds of the plant hole has been backfilled, the hole shall be filled with water and the soil allowed to settle around the ball. Plants shall have the twine or rope and burlap cut away or folded back from the top of the ball before applying the water. After the water has been absorbed, the plant hole shall be filled with topsoil and tamped lightly to grade. Any settlement shall be brought to grade with topsoil. Unless otherwise directed or specified, a shallow rain cup or berm shall be formed in the completed backfill by shaping the soil around the plant.
09. Landscape fabric shall be laid over all soil where mass shrub planting is shown. Mulch shall then be placed over the fabric to a depth of 4", unless otherwise specified.
10. Trees shall be guyed with two wires whose ends encircle the tree trunk, just below the lowest main branches of deciduous trees. The other ends shall be anchored to stakes set in the ground around the tree, equal distance apart and at a distance from the tree of approximately three-fourths the distance from the ground to the upper point of fastenings. The anchor stakes shall be notched to prevent slipping of the wire and shall be driven into the ground, at a slight angle away from the tree, to a depth of 24 inches or more until solid, and shall extend above the ground as shown on drawings. The bracing and guying materials shall consist of such wood or steel stakes, wire, rubber hose, soft rope or straps, turnbuckles and other material as needed to perform the work. Stakes shall be of solid durable wood approximately 2" x 2" and of the required length, except that stakes used for bracing may be approved steel posts of the required length.
11. Wire of good quality shall be No. 11 or 12 steel wire when used for trees of 4" or less in diameter and no. 9 or 10 for trees over 4" in diameter. A suitable turnbuckle for adjusting the wire shall be used with the larger wire.
12. Each wire where it encircles the tree shall be enclosed in a hose of sufficient length to clear the trunk 6" at the ends. The wires shall be drawn taut to equal tension, by means of twisting or use of turnbuckles, and securely fastened, with the trunk of the tree remaining in a vertical position.

3.02 MAINTENANCE

A. Maintain plants as follows during the construction period:

01. A plant establishment period shall follow the completion of planting. The plant establishment period for material planted in the spring shall extend until the following spring, and when the planting is completed in the fall, the plant establishment period shall extend until September 15 of the succeeding year.
02. The Contractor shall properly care for all plants from the time of planting until the date of substantial completion.
03. Proper care of plants shall consist of doing such watering, weeding, cultivating, pruning, spraying, tightening of braces and guys, remulching and such other work as may be necessary to keep the plants in a healthy growing condition.
04. A sufficient amount of water shall be placed in each plant hole at the time of each watering to keep the topsoil backfill material in a moist condition, and to keep the plant in a healthy growing condition.
05. All mulched areas shall be kept free of weeds by hoeing and hand weeding.
06. Pesticides shall be applied as required to control insects and disease and to keep the plants in a healthy condition during the maintenance period.

3.03 CLEAN-UP

A. Any soil, manure, peat or similar material which has been placed on paved areas shall be removed and washed clean promptly, keeping the area clean at all times. Upon completion of the planting, all excess soil, stones, and debris shall be removed from the site. All ground areas disturbed as a result of planting operations shall be restored to their original condition or to the desired new appearance.

END OF SECTION

SECTION 02932
SEEDING

PART 1 _ GENERAL

1.01 INCLUDED: Native grass or bluegrass seeding in all areas specified in plans and disturbed by construction activities excluding sod areas and shrub beds.

1.02 RELATED: General and Supplemental Conditions and all of Division One Sections govern and are hereby made a part of work of this Section.

A SOIL PREPARATION: SUBSECTION 02915.

1.03 QUALITY ASSURANCE: Materials, items, accessories, manufacturers, processes, proprietary, are listed in Part 2 _ PRODUCTS and Part 3 _ EXECUTION of this Spec Section.

A. QUALITY OF MATERIALS: Seed materials shall be subject to inspection and approval. Landscape Architect reserves the right to reject at any time or place prior to acceptance, work and seed which, in the Landscape Architect's opinion, failed to meet these Specification requirements. Inspection is primarily for quality; however, other requirements are not waived even though visual inspection results in approval. Inspection may be made periodically during seeding, at completion and at the end of guarantee period, by the Landscape Architect.

B. TIME OF PLANTING: Landscape Contractor shall inform Landscape Architect three days prior to commencement of seeding; thereafter seeding operations shall be continued during favorable weather conditions. At option, and on full responsibility of Landscape Contractor, seeding may be conducted under unseasonable conditions, without extra compensation.

1.04 REFERENCES: Comply with requirements of manufacturer, codes, specifications, and standards cited in this Spec Section, except where more stringently shown or specified, comply with the construction documents.

A. STANDARDS: U.S. Department of Agriculture Rules and Regulations under Federal Seed Act and equal in quality to standards for Certified Seed.

1.05 SUBMITTALS:

A. CERTIFICATES OF INSPECTION FOR MATERIALS _ State, Federal, or other inspection certificates shall accompany invoice for materials showing source or origin. File with Landscape Architect's representative prior to acceptance of material.

B. MAINTENANCE INSTRUCTIONS _ At completion of work furnish three copies of written maintenance instructions to Landscape Architect for maintenance and care of installed seeding. Instructions shall include directions for irrigation, fertilizing and spraying as required for continuance and proper maintenance through a full growing season and dormant period. Maintenance will be responsibility of seeding contractor as per this Section.

1.06 PRODUCT DELIVERY/STORAGE/HANDLING:

A. SEED _ Deliver seed in sealed standard containers, stating correct seed name and composition on outside of container. Seed damaged in transit or storage will not be accepted. Notify Landscape Architect's representative of delivery schedule in advance so material may be inspected upon arrival at jobsite. Unacceptable material shall be removed immediately from jobsite.

B. CHEMICAL FERTILIZER _ Deliver chemical fertilizer to site in original unopened container bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark and conformance to State Law, bearing name and warranty of producer.

1.07 JOBSITE CONDITIONS _ Seeding Contractor shall be responsible for proper repair of any underground pipe or electrical wiring damaged by operations under this Section. Repairs will be made by contractors designated by Landscape Architect with cost being charged to the contractor

responsible for damages. Seeding Contractor shall notify General Contractor where seeded areas should be protected and barriers installed for proper protection and traffic control. Seeding Contractor shall install barriers at his expense.

1.08 GUARANTEE _ Seeded areas shall be guaranteed for one growing season to be in a healthy vigorous growing condition. Bare areas greater the 12" by 12" will be re-seeded at no additional cost to the client until final acceptance. During original guarantee period seeded areas that die due to natural causes, failure of germination, etc., or that are in opinion of Landscape Architect unhealthy, shall be re-seeded as required and at expense of Seeding Contractor. Such replacements shall be installed as specified, equal to original planting. Should settlement occur, Contractor will fill and compact settled areas and reseed affected areas per these specifications.

PART 2 _ PRODUCTS

2.01 SEED:

A. 100% KENTUCKY BLUEGRASS SEED
Seeding rate of 2 pounds per 1000 square feet.

B. Woodland Seed Mix
Seeding rate of 2 pounds per 1000 square feet.

2.02 HYDRAULIC MULCH _ Hydraulic mulch shall be wood cellulose fiber with a nonasphaltic tackifer (Conwed 2000 or equal), with green color additive to allow visual metering of application or approved equivalent. Wood cellulose fibers shall have property to become evenly dispersed and suspended when agitated in water. When sprayed uniformly on soil area fibers shall form a blotter like ground cover which readily absorbs water allowing filtration to subsurface soil. Weight specifications shall refer only to air dry weight, a standard equivalent to 10% moisture. Water and wood cellulose fiber shall be mixed to form a homogenous slurry.

2.03 EROSION CONTROL NETTING: Jute mesh erosion control netting or other suitable type as accepted by the Landscape Architect.

PART 3 _ EXECUTION

3.01 PREPARATION:

A. LAYOUT _ Areas to be seeded shall be verified on site by seeding contractor prior to starting operations. An estimate of the amount of seeding required shall be provided to the Landscape Architect prior to beginning work.

B. PREPARATION _ Seed areas shall be free of debris and/or rocks larger than 1", which may hinder tilling, seeding, finish grading or subsequent operations. Accumulated debris shall be disposed of off-site at direction of the General Contractor or Landscape Architect. Seeding Contractor shall perform finish grading as required to maintain drainage into catch basins, drainage structures, etc., and as required to provide a smooth well-contoured, freely draining surface prior to proceeding. No seeding shall occur until the Landscape Architect's has examined and approved the base preparation.

3.02 SEEDING:

A. BROADCAST SEEDING - Seed shall be broadcast and harrowed or raked, and rolled to assure good seed/soil contact. Seed shall have 1/4" cover upon completion of raking and rolling operations. Seed shall not be broadcast during windy weather or when ground is frozen or otherwise un-tillable.

3.03 MULCHING _ Mulch shall be hydraulically applied (mixed with water) with a heavy tackifying agent at a rate of 2,000 lbs. per acre. Hydro mulching shall not be done during or after rainstorms, when water is standing or when runoff is occurring.

3.04 NETTING _ Install netting pegged in accord with manufacturer recommendations and standard installation procedures on all slopes 3:1 or greater. Cover netting with straw or other acceptable mulch. Maintain netting as required.

3.05 MAINTENANCE & ACCEPTANCE _ Maintenance period shall begin immediately after each area is seeded, and continue until final acceptance of landscaping work. During this time Contractor shall be responsible for mowing, weeding and related work as necessary to insure that seeded areas are in a vigorous growing condition until final acceptance. Landscape Architect will direct Contractor on what seed areas need to be replaced during this period. Areas that are not producing a uniform plant growth shall be re-seeded. Acceptable uniform plant growth shall be defined as when there are no bare spots, not greater than 1 sq. ft. Native Grass areas shall be mowed as recommended by the seed supplier.

3.06 CLEAN_UP _ After completion, objects or debris which may interfere with maintenance operation shall be removed. Paved areas over which operations have been conducted shall be cleaned. Remove excess mulch immediately from trees, shrubs and sod to prevent damage to same.

END OF SECTION

SECTION 02934
SODDING

PART 1 - GENERAL

1.01 INCLUDED - Work of this Spec Section generally includes provision for bluegrass sod in all areas disturbed by construction.

1.02 RELATED - General and Supplemental Conditions and all of Division One Sections govern and are hereby made a part of all work of this Section.

A. FINISH GRADING: SECTION 02210.
B. SOIL PREPARATION: SECTION 02920.
C. TOP SOIL: SECTION 02910

1.03 QUALITY ASSURANCE - Materials, items, accessories, manufacturers, processes, proprietary, are listed in Part 2 - PRODUCTS (and Part 3 - EXECUTION) of this Spec Section.

A. QUALITY OF MATERIALS - Sod materials shall be subject to inspection and approval. Owner's Representative reserves the right to reject at any time or place prior to final acceptance, work and sod which in the Owner's Representative's opinion fails to meet these Specifications. Inspection is primarily for quality; however, other requirements are not waived even though visual inspection results in approval. Sod may be inspected where growing, but inspection at the place of growth shall not preclude right of rejection at site. Rejected sod shall be promptly removed from site. Inspection shall be made periodically during laying of sod, at completion and at end of guarantee periods by Owner's Representative.

1.04 REFERENCES - Comply with requirements of manufacturer, codes, specifications, and standards cited in this Spec Section, except where more stringently shown or specified, comply with the construction documents.

A. STANDARDS - U.S. Department of Agriculture Rules and Regulations under Federal Seed Act and equal quality to standards for Certified Seed.
B. Cut sod using an approved method, in accordance with local governing American Sod Producers Association.

1.05 SUBMITTALS:

A. CERTIFICATES OF INSPECTION FOR MATERIALS - State, Federal, or other inspection certificates shall accompany invoice for materials showing source or origin. File with Owner's Representative prior to acceptance of material.
B. MAINTENANCE INSTRUCTIONS - At completion of work, furnish three copies of written maintenance instructions to Owner's Representative for maintenance and care of installed sod through its full growing season. Maintenance will be responsibility of Sodding Contractor until final acceptance of project. Owner will be responsible for maintenance after that date.

1.06 PRODUCT DELIVERY/STORAGE/HANDLING:

A. Deliver sod properly loaded on vehicles and protected from exposure to sun, wind, heating, in accord with standard practice and labeled in accord with Federal Seed Act.
B. CHEMICAL FERTILIZER - Deliver chemical fertilizer to site in original unopened container bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark and conformance to State Law, bearing name and warranty of producer.
C. SOD ROLLS shall not be dropped from loading carts, trucks or sod pallets. Sod damaged in transit or storage will not be accepted. Notify Owner's Representative of delivery schedule in advance so material may be inspected upon arrival at jobsite. Unacceptable material shall be removed immediately from jobsite.

1.07 JOB CONDITIONS - Sodding Contractor shall be responsible for proper repair of lawn watering system, other underground pipe or electric wiring damaged by operations under this Section. Repairs will be made by contractors designated by the Owner's Representative with cost being charged to contractor responsible for damages.

A. DAMAGED AREAS shall be repaired to re-establish grade and condition prior to sodding.
B. SOD DESTRUCTION - Responsibility for vandalized sod will be determined per PLANT MAINTENANCE AND ACCEPTANCE, PART 3, Section 02930. Sodding Contractor shall install barriers for proper protection and traffic control.

1.08 GUARANTEE -Sod shall be guaranteed for one growing season to be in a healthy, vigorous growing condition. During guarantee period, sod areas that die due to natural causes, or that are in Owner's Representative's opinion, unhealthy, shall be replaced at once, and at expense of the Sodding Contractor. Such replacements shall be installed as originally specified and guaranteed.

PART 2 - PRODUCTS

2.01 SOD/FERTILIZER:

A. SOD shall be Wisconsin grown 100% Kentucky bluegrass sod comprised of at least three improved varieties, or approved substitute.

01. SOD SHALL HAVE VIGOROUS ROOT SYSTEM, been regularly fertilized, watered, mowed, free of weeds and objectionable grasses, and provide a thick turf. Note supply source and mixture on Bid form. Each piece of sod will have a sandy_loam soil base that will not break, crumble or tear during sod installation. Sod shall be cut in strips 48" wide (minimum), with a soil base not less than 5/8" (1.75cm), nor more than 3/4" (2cm) thick. Sod shall be cut no more than 24 hours prior to delivery, kept damp on pallets at the site, and laid in place within 24 hours of delivery.

B. CHEMICAL FERTILIZER

C. Fertilizer shall be approved by Owner's Representative prior to application.

PART 3 - EXECUTION

3.01PREPARATION:

A. LAYOUT of sodded areas is indicated on landscape drawing(s). Sodding Contractor shall verify locations on-site prior to starting operation.

B. PREPARATION - Sodded areas shall be prepared per Spec SECTION 02920 and shall be free of debris, and/or rocks larger that 1" which may hinder tilling, sodding, finish grading or subsequent operations. Accumulated debris shall be disposed of at direction of the Owner's Representative. Sodding Contractor shall perform finish grading required by drawings, to maintain drainage into catch basins, drainage structures, etc., and to provide a smooth, well-contoured surface prior to proceeding.

01. FINISH GRADES - It shall be Sodding Contractor's responsibility to assure finished grades of sod are such that drainage of storm and irrigation waters will occur and ponding of water will be prevented. Refer to Spec SUBSECTION 02210.

02. BASE PREPARATION - Soil shall be prepared in accordance with Spec SECTION 02920 (Soil Preparation). No sod will be laid until Owner's Representative has examined and approved base preparations.

C. TILLAGE - Sodded areas shall be thoroughly tilled to an average depth of 6" until soil is sufficiently pulverized per Spec SECTION 02920. Work shall not be performed when conditions will not provide satisfactory results.

3.02 FERTILIZING - Distribute chemical fertilizer uniformly at rate recommended by the results of the soil tests and in conformance with manufacturer’s instructions.

3.03 SODDING – Soil (48” WIDE ROLLS) on which sod is laid shall be lightly moist, sod ends and sides shall be butted tightly together, laid with longest dimensions parallel to contours and continuous rows. Vertical joints between sod strips shall be staggered, and the sod shall be compacted by rolling, so it will be incorporated with ground surface insuring tight joints between adjacent pieces. All rows terminating on designated property lines will be cut equal to a straight line. Topsoil shall be added along exposed edges to match adjacent grade. Feather topsoil out approximately 1' from edge of sod. Sod shall be laid flush with adjacent walks, curbs, etc.

A. Secure sod on slopes of 3.5:1 or more with wood pegs as required to prevent slippage.

B. Sod laid adjacent to existing bluegrass turf shall be installed so there is no noticeable transition.

3.04 WATERING - Sod shall be initially watered upon completion of convenient work areas until installation is complete and irrigation system can be operated under full control. The Contractor shall work with the Owner to coordinate the operation of the irrigation system to assure water is available to sodded areas in the amounts required. If permanent irrigation is not available through fault of the Contractor, the Contractor shall provide temporary irrigation as necessary and at no additional cost to the Owner. Water sod sufficiently to moisten subsoil at least 4" deep, in a manner not to cause erosion or damage to adjacent finished surfaces. Any damage or erosion to adjacent areas as a result of watering of sodded areas shall be the sole responsibility of the Contractor with no additional cost to the Owner.

3.05 MAINTENANCE & ACCEPTANCE - Maintenance period shall begin immediately after each area is sodded, and continue until final acceptance of all project work. During this time Sodding Contractor shall be responsible for watering, mowing, spraying, weeding and related work as necessary to insure that sodded areas are in vigorous growing condition until final acceptance. Owner's Representative will direct Sodding Contractor on what sod areas need to be replaced during this period.

3.06 CLEAN-UP - Pallets, unused sod, and other debris shall be removed from site, and paved areas over which operations have been conducted shall be cleaned. Paved areas are to be broomed and washed with water.

END OF SECTION

SECTION 03100
FORMWORK

PART 1 _ GENERAL

1.01 INCLUDED: Work of this Spec Section generally includes provision of wood, plywood, metal, plastic formwork for structural cast_in_place concrete, and items to be set in concrete.

1.02 RELATED: General Requirements Division One of the Project Manual pertains to and is hereby made a part of the work of this Section.
- A. CONCRETE FLATWORK, PAVING, is Spec SECTION 02520.
- B. REINFORCEMENT is Spec SECTION 03200.
- C. ACCESSORIES is Spec SECTION 03250.

1.03 QUALITY ASSURANCE: Materials, items, accessories, manufacturers, proprietary are listed in Part 2 _ PRODUCTS of this Spec Section.
- A. ALLOWABLE TOLERANCES:
  - 01. CAST_IN_PLACE WORK:
    - a. FLATWORK: Slabs , curb, ramps, walks, seating areas, shall not be out of level more that 1/8" in 10' above or below elevation(s) shown.

1.04 REFERENCES: Comply with requirements of manufacturer, codes, specifications, standards, referred to in this Spec Section, except where more stringently shown or specified comply with construction documents.
- A. American Concrete Institute (ACI):
  - 01. ACI 318_77 Building Code Requirements for Reinforced Concrete.
  - 02. ACI 347_78 Recommended Practice for Concrete Formwork.
- B. American Plywood Association (APA):
  - 01. APA Jan 1980 Plywood Specification & Grade Guide.
- C. American Society for Testing and Materials (ASTM):
  - 01. ASTM A36_77a Spec for Structural Steel.
- D. U.S.A. Department of Commerce/National Bureau of Standards (DOC/NBS) Product Standards (PS):
  - 01. DOC/NBS PS1_74 Construction and Industrial Plywood.
- E. U.S.A. Western Wood Products Association (WWPA):
  - 01. WWPA Jun 1, 1979 Standard Grading Rules for Western Lumber.

PART 2 _ PRODUCTS

2.01 MATERIALS/ITEMS/ACCESSORIES may be new or reused, optional with installer provided no extra cost charge(s) to Owner; wood, plywood, metal or plastic, or combinations thereof. Board material may be used only to form nonexposed_to_view concrete surfaces. Formwork material shall be clean, straight and of sufficient thickness and construction to withstand pressures of newly_placed concrete without allowing bow or deflection, free of extraneous holes and provided in largest practical sizes available to minimize jointing.

PART 3 _ EXECUTION

3.01 ERECTION: Design, construct, fabricate, support, brace and maintain formwork in accord with ACI 347 to obtain accurate and correct alignment, location, elevation, position, levelness, and plumbness to provide concrete members and structure of sizes, shapes, lines, dimensions required by drawings.
- A. INCLUSIONS: Provide openings, offsets, sinkages, keyways, recesses, chamfers, blocking, screeds, bulkheads, anchorages, inserts, other features required by the work.
- B. FABRICATING: Assemble forms for easy removal without the necessity for hammering or prying against newly formed concrete surfaces.
  - A. PROTECTION PLATES: Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
  - C. KERFING: To minimize swelling and to allow for easy removal kerf (bevel) wood inserts when forming keyways and recesses.
  - D. CHAMFERING: Ease exposed to view out edges and out corners of walls and flatwork (slabs) concrete with preformed rounded or mitered wood, metal, PVC, or rubber chamfer strips fabricated to produce tight

edge joints with smooth uniformly continuous lines.

E. REMOVAL of forms will be in accord with ACI 318. Forms shall not be disturbed until concrete has adequately hardened.

F. TIE BARS: If tie bars are used they shall be placed so that they are either above or below exposed portions of the wall.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

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 reinforcing steel and accessories as specified herein or shown on the drawings. All work shall be done in accordance with the latest A.C.I. Code unless otherwise detailed.

C. Related Work Specified Elsewhere:
   01. Concrete Flatwork, Paving - Section 02520
   02. Cast-In-Place Concrete - Section 03300

1.02 REFERENCE STANDARDS

A. ASTM A615 - Reinforcing Bars
B. ASTM A185 - Welded Wire Fabric
C. ACI 315 – Details and Detailing of Concrete Reinforcement
D. ACI 318 - Building Code Requirements For Structural Concrete
E. ACI 301 – Standard Specifications for Structural Concrete
F. CRSI – Manual of Standard Practice

1.03 SUBMITTALS

A. Submit shop drawings to the Owners Representative for approval in accordance with the requirements of Division 01. No material shall be fabricated until such drawings have been approved.

B. List and mark bars, showing sizes, lengths, location, bending numbers and ASTM designation.

C. Show location, type and quantities of bolsters, spacers, chairs support bars and bar dowels.

1.04 TESTS

A. Any concrete reinforcing field welded on the site shall be inspected by the County. Contractor shall pay for special inspections of welded reinforcing.

1.05 DELIVERY, STORAGE AND HANDLING

A. Reinforcing steel shall be shop fabricated to conform to the approved shop drawings. All bars shall be free from mill scale, excessive rust of other coating which would reduce or destroy the bond with the concrete.

B. After fabrication, all bars shall be bundled before delivery to the job. Each bundle shall be identified by attaching metal tags bearing the bars marks.

C. Reinforcing steel, after delivery to the job, shall be stored clear of the ground and protected from damage and rusting.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All reinforcing steel shall be from domestic mills. No foreign or imported steel will be permitted. All materials shall bear manufacturers standard rolled-on identification grade markings.

B. Reinforcing bars shall be deformed bars conforming to ASTM A-615, Grade 60 for straight bars and Grade 60 for bent bars, with identification marks rolled in the bars. Furnish all tiles, spacers, chairs, bolsters and similar accessories required for assembling, placing and supporting the reinforcing. Reinforcing shall be clean and free from loose rust, scale and other coatings that will reduce bond.

C. Reinforcing mesh shall be welded wire fabric conforming to ASTM-A- 185. Mesh not otherwise indicated shall be fabricated from 10-gauge wire spaced 6" each way (6/6 x 10/10).

2.02 DETAILING

A. Reinforcing steel shall be detailed in accordance with the above-mentioned ACI "Building Code" and CRSI “Manual of Standard Practice", unless specifically shown otherwise. The number, type and spacing of supports and other accessories shall be as recommended in the CRSI "Manual of Standard Practices".

2.03 FABRICATION

A. Shop fabricate reinforcing bars to conform to required shapes and dimension, with fabrication tolerances complying with ACI 315. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.
B. Bend all bars cold.
C. Do not use bars with kinks or bends not shown on the drawings or on the approved shop drawings.
D. Do not bend or straighten steel in a manner that will injure the material.

PART 3 - EXECUTION

3.01 PLACING REINFORCING STEEL

A. All reinforcing steel shall be placed strictly in accordance with the approved shop drawings. Accessories shall be furnished in sufficient quantity for proper location of all reinforcement in position shown on the drawings. Accessories shall be sufficient to hold bars securely in position in spite of construction traffic and to insure against displacement during placement of concrete.
B. Reinforcing bars shall be protected by the thickness of concrete indicated on the drawings. Where not otherwise shown, this thickness shall be as follows:
   Footings, Bottom..... 3"
   Walls..... 1-1/2"
   Slabs, Self-supporting..... 3/4"
C. Welded wire mesh reinforcing shall be placed at mid-height of concrete slabs.
D. Reinforcing steel shall be inspected in the forms and approved by the Architect/Owners Representative before the concrete is poured.
E. Splicing:
   01. Splicing of bars, bar spacings and concrete cover should conform to "Building Code Requirements for Structural Concrete (ACI 318)", published by the American Concrete Institute of recommended practices in "Splicing Reinforcing Bars" by the CRSI.
   02. Use "L" dowels to carry all horizontal reinforcing in walls and footings around corners. Diameter of dowels to be equal to the diameter of the reinforcing bars being extended.
   03. Splices in bond beam reinforcing shall be 2'-6" minimum.
   04. Splices shall be Class "B" lap splices minimum unless indicated otherwise.
   05. Splicing by welding of reinforcing bars shall not be permitted.
   06. Splicing with dowel bar substitution and splicing system shall be performed in strict accordance with the manufacturer's instructions.
F. Obstructions - In the event conduits, piping, inserts, sleeves or any other items interfere with placing reinforcement and indicated on the drawings, or as otherwise required, immediately consult the Owners Representative and obtain approval of new procedure before placing concrete.

3.02 INSPECTION OF STEEL IN PLACE

A. The Architect/Owners Representative will inspect the reinforcing steel in place prior to the pouring of the concrete for each section. Contractor shall also contact the Building Official for any inspections required.
B. Do not pour concrete until approval has been obtained from the Architect/Owners Representative. Notify the Architect/Owners Representative sufficiently in advance of the scheduled time for pouring of the concrete to allow the inspection to be made and corrections completed, where required. Correction shall be made by the Contractor at his expense.
C. Exposed reinforcing steel, indicating the bars are not properly located, after the concrete has been placed will be sufficient cause for the rejection, removal and replacement of the concrete section.

END OF SECTION

SECTION 03250
CONCRETE ACCESSORIES

PART 1 - GENERAL

1.01 INCLUDED: Work of this Spec Section generally includes provision of expansion and contraction joint fillers, anchors, inserts, for structural cast-in-place concrete.

1.02 RELATED: General Requirements Division One of the Project Manual pertains to and is hereby made a part of the work of this Spec Section.
A. CONCRETE FLATWORK, PAVING: Spec SECTION 02520.

1.03 QUALITY ASSURANCE: Materials, items, accessories, manufacturers, proprietary, are listed in Part 2 - PRODUCTS of this Spec Section.

1.04 REFERENCES: Comply with requirements of manufacturer, codes, specifications, standards, cited in this Spec Section, except where more stringently shown or specified comply with construction documents.
A. American Concrete Institute (ACI):
01. ACI 318-77 (1978) Building Code Requirements for Reinforced Concrete.
B. American Society for Testing and Materials (ASTM):
01. ASTM D1751-73 (1978) Spec for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
02. ASTM D1752-67 (1978) Spec for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.05 SUBMITTALS shall be made in compliance with Spec SECTION 03100.
A. SAMPLES are required of exterior expansion joint fillers.

1.06 DELIVERY/STORAGE/HANDLING: Deliver, unload, store and handle materials, packaging, products, in dry, weatherproof, waterproof condition in manner to prevent damage, breakage, deterioration, ignition, intrusion, vandalism. Deliver in original unopened packaging containers prominently displaying manufacturer name, proprietary, quantity, contents and instructions. Remove and replace crushed, broken, split, deformed, spoiled or contaminated items and elements prematurely exposed to moisture, inclement weather, temperature extremes, fire, job site damage.

PART 2 - PRODUCTS

2.01 MATERIALS & ITEMS:
A. EXTERIOR EXPANSION JOINT FILLERS - 1/2" (1.3cm) thick by full depth of slab by lengths required Grace SERVICISED KORK-PAK, J&P Petroleum Products TEX-LITE, W.R. Meadows SEALTIGHT or similar Owner’s Representative accepted non-extruding resilient bituminous material meeting ASTM D1751.

PART 3 - E X E C U T I O N

3.01 INSTALLATION:
A. EXTERIOR EXPANSION JOINT FILLERS - Unless otherwise shown or noted provide at maximum 25'-0" centers in walks, ramps, curbs, gutters, elsewhere as may be shown or noted.
B. SCORING - To be executed as shown on Drawings and details.
C. WATERPROOFING shall be installed as per manufacturer's specifications.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

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 mix, place and cure all concrete in accordance with the drawings, schedules and this specification.
C. Build into concrete the following materials as required, which may be supplied under other sections of this Specification:
   01. Reinforcing steel.
   02. Sleeves and thimbles for pipes and conduit.
   03. Inserts, hangers and anchors for work of all trades.
   04. Items of structural, miscellaneous iron or ornamental metals which occur in concrete.
D. Related work specified elsewhere:
   01. Concrete Flatwork, Paving - Section 02520
   02. Concrete Form Work - Section 03100
   03. Concrete Reinforcement - Section 03200

1.02 REFERENCE STANDARDS

A. The current issue of the following specifications, test methods and recommended practices shall govern except where superseded by particular requirements of this specification.
   01. Specifications for Ready-Mixed Concrete, ASTM C-94.
   02. Specifications for Portland Cement, ASTM C-150.
   03. Specifications for Concrete Aggregates, ASTM C-33.
   04. Method of Test for Slump of Portland Cement Concrete, ASTM C-143.
   05. Method of Sampling Fresh Concrete, ASTM C-172.
   06. Method of Making and Curing Concrete Compression and Flexure Test, ASTM C-31.
   07. Method of Test for Compressive Strength of Molded Concrete Cylinders, ASTM C-39.
   08. Specification for Air-Entraining Admixtures for Concrete, ASTM C-260.

1.03 TESTS

A. LABORATORY- All tests shall be by a recognized testing laboratory approved by the County/Owners Representative.
B. Owner shall pay for all tests performed on concrete and concrete materials.
C. Provide the following tests:
   01. Slump as per ASTM C-143, One for each pour.
   02. Compression as per ASTM C-39, 3 cylinders for each pour.
D. The contractor shall secure samples and shall provide safe storage for them pending their removal to the testing laboratory. The contractor shall provide shipping containers as required for transporting cylinders to the testing laboratory.
E. To conform to the requirements of this specification, every twenty-eight (28) day test representing each mix must be equal to or greater than the specified minimum strength without exception. If a specimen shows manifest evidence of improper sampling, molding or testing, it will be disregarded. Note, however, that the anticipated strength for all mixes is appreciably above the specified minimum strength, due to quality required by the minimum cement content specified.
F. Slump tests shall be made from the same batch from which strength tests are made. The contractor shall provide a standard slump cone for this testing. If the measured slump falls outside the limits specified, a check test will be made immediately on another portion of the same sample. In the event of a second failure, the concrete will be considered to have failed to comply with the specification.
G. Air content tests shall be made from the same batch from which strength tests are made. If the measured air content falls outside the limits specified, a check test will be made immediately on another portion of the same sample. in the event of a second failure, the concrete will be considered to have failed to comply with the specification.
H. County/Owners Representative may require additional testing of concrete, including cement content or chloride presence. Tests which comply with the specification shall be paid for by the Owner. Tests which

fail to comply with the specifications will be paid for by the contractor.

I. Two (2) copies of test results shall be forwarded directly from the testing laboratory to the County/Owners Representative.

1.04 SUBMITTALS

A. Submit concrete mix designs to the County/Owners Representative for approval in accordance with the requirements of Division 01.

B. Mix design shall state proportions of all materials used in the concrete mixture; source and gradation of aggregate; manufacturer of cement and manufacturer of all admixtures to be used.

1.05 QUALITY ASSURANCE

A. The current issue of the following American Concrete Institute (ACI) requirements and recommended practices shall govern except where supersede by particular requirements of this specification:
   01. Building Code Requirements for Structural Concrete ACI-318.
   02. Standard Practice for Selecting Proportions for Concrete, ACI-211.
   03. Standard Specifications for Cold Weather Concreting, ACI-306.1.
   04. Standard Specifications for Structural Concrete for Buildings, ACI-301.

1.06 DELIVERY STORAGE AND HANDLING

A. Cement shall be stored in a weatherproof building on pallets approximately 6" above the floor.

B. Aggregates fine, medium and coarse shall be stored separately and in such a manner as to prevent segregation of size and to avoid the inclusion of dirt and other foreign materials.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. AGGREGATES: Conform to ASTM C-33.
   01. Course Aggregate Material: Strong, clean crushed granite or limestone gravel, are subject to approval as to use, other inert material having similar characteristics, free from adherent coatings and injurious amount of friable or fragile pieces, flake organic matter, or other deleterious substances, all meeting the following gradation requirements:
      a. Footings 1-1/2"
      b. Slabs on grade, structural slabs, foundations, columns and beams 3/4"
      c. Bond Beams, concrete topping 3/8"
   02. Fine Aggregate Material: Clean, strong, natural are subject to approval and authorization as to use, other inert material suitable for the work to be done, having characteristics similar to natural sand, free of frozen materials, all meeting the following grading limits:
      a. Passing No. 4 Sieve 95% to 100%
      b. Passing No. 14 Sieve 45% to 80%
      c. Passing No. 50 Sieve 10% to 30%
      d. Passing No. 100 Sieve 2% to 10%

B. CEMENT - Conforming to ASTM C-150, Type I.

C. WATER - Clean, free from oil, acids and injurious amounts of vegetable matter, alkalis or other salt, and of drinkable quality.

D. No admixtures shall be used except with specific written approval of the County/Owners Representative. CALCIUM CHLORIDE OR MATERIALS CONTAINING CHLORIDES OR NITRATES WILL **NOT** BE PERMITTED IN ANY CASE AND WILL NOT BE KNOWINGLY APPROVED. USE OF SUCH MATERIALS, WITH OR WITHOUT APPROVAL, WILL ALLOW THE COUNTY/OWNERS REPRESENTATIVE TO REQUIRE REMOVAL AND REPLACEMENT OF ALL CONCRETE CONTAINING OR TREATED WITH, SAME.
   a. Coloring is to be applied in strict accordance with manufacture’s specification
   b. Color to be selected by Architect/Owners Representative

2.02 CONCRETE ADDITIVES

A. Air Entrainment Agent: Conform to ASTM C260 to produce air entrainment of 5% to 7%. Air entrainment admixture shall be used in strict accordance with the manufacturer's recommendations and shall be one of the following or approved equal:
   01. W.R. Grace - Darex AEA
   02. Protex Industries - Pro-Air
   03. W.R. Meadows - Sealtight Air Entrainment Agent
   04. Sika - Sika AER
   05. Euclid - Air Mix

2.03 CONCRETE JOINT MATERIALS

A. BOND BREAKER: at juncture concrete slabs and adjacent footings shall be 15 lb. felt with adhesive on one side.
B. CONTROL JOINT FORMER: shall be a one piece plastic insert with removable top cap. Joint former shall be sized to 1/3 the depth of the slab. Joint former shall be as follows or approved equal:
   01. Greenstreak Plastic Products - Zipcap
   02. Progress Unlimited - Crack Inducer
   03. DeMay - Zipstrip
C. Expansion Joint Filler: shall be an asphalt, vegetable fibers and mineral filler joint formed under heat and pressure between two asphalt felt liners conforming to ASTM D994. It shall be resistant to oil, solvents, ozone and weathering. Joint Filler shall be as manufactured by one of the following or approved equal:
   01. W.R. Meadows, Inc. - Sealtight Asphalt Expansion Joint Filler

2.04 CONCRETE MIXES

A. All concrete used throughout this construction shall be ready-mixed concrete furnished by a well established mixing plant.
B. Concrete shall be furnished in accordance with the following schedule:

Class of Concrete	Compressive Strength @ 28 days	Maximum aggregate size	Cement Type
A	4000	1-1/2"	Non-Air Entrained
B	4000	3/4"	Non-Air Entrained
C	4000	3/4"	Non-Air Entrained
D	3000	3/8"	Non-Air Entrained
E	4000	3/4"	Air Entrained

C. The class of concrete to be used for various conditions shall be as follows:
   01. Footing - Class A
   02. Foundations - Class B
   03. Slab on Grade - Class B
   04. Columns & Beams - Class C
   05. Exterior Concrete - Class E
D. Where mechanical vibrators are used in placing the concrete, the slump shall not exceed 3" in any case. Where mechanical vibrators are not used, the slump may vary between the limits noted.

PART 3 - EXECUTION

3.01 MIXING AND DELIVERY

A. Ready-Mixed concrete shall be mixed and delivered to the job site by the means and standards set forth in

ASTM C-94.

B. No water shall be added on the job unless authorized by the Architect/Owners Representative in writing. If added, the amount of water added shall be recorded on all copies of the delivery ticket hereinafter described. If water is added to mixed concrete on arrival at the job, an additional mixing of twenty revolutions of the drum will be required.

C. Concrete delivered in outdoor temperatures lower than 40 degrees F., shall arrive at the site of the work having a temperature not less than 60 degrees F., nor greater than 90 degrees F. unless otherwise specified or permitted by the Architect/Owners Representative.

D. With each load of concrete delivered to the job, there shall be furnished by the ready-mixed concrete producer, duplicate delivery tickets, one for the contractor and one for the Architect/Owners Representative. Delivery tickets shall provide the following information:
   01. Date
   02. Name of Ready-Mixed concrete plant
   03. Contractor
   04. Job Location
   05. Type and brand of cement
   06. Class and specified cement content in bags per cubic yard of concrete.
   07. Maximum size of aggregate
   08. Water added at job, if any
   09. Truck number
   10. Time Dispatched
   11. Amount of concrete, in load, in cubic yards.

3.02 PLACING CONCRETE

A. Before placing any concrete Engineer shall be notified in sufficient time to allow inspection of concrete reinforcing in place.

B. Before placing concrete, excavation shall be dry, forms and reinforcement shall be clean, and reinforcement shall be securely tied into place. Forms shall be treated with releasing agent.

C. Concrete shall be transported from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent the separation of ingredients or displacement of reinforcement. It shall be deposited as nearly as possible in its final position to avoid rehandling or flowing. Deposit concrete in such a fashion that free fall of concrete will not exceed 3 feet.

D. Concrete shall be placed before initial set has occurred and in no case after it has contained its water more than 30 minutes.

E. The Contractor shall provide sufficient labor to thoroughly spade, or by internal mechanical vibration, work the coarse aggregate away from the forms and avoid air pockets or voids in exposed sections, and leave solid, homogenous and smooth uniform surface after forms are removed. Concrete for slabs on fill shall be mixed and placed with as little water as possible, and shall be compacted by spading and tamping.

F. For slabs on grade, check compaction of fill and determine proper grade. Moisten subgrade thoroughly just before exterior slabs are cast.

3.03 TOLERANCES

A. ACI Standards shall govern concrete work except where specified differently.

B. Allowable Tolerances -
   01. Variation from plumb:
      a. 0 to 10 feet - 1/4" maximum
      b. 20 feet or more - 3/8" maximum
   02. Variation in thickness - 1/4" to 1/2" standard, 5% for footings
   03. Variation in grade:
      a. 0 to 10 feet - 1/4" standard,
         1/8" for floors
      b. 10 to 20 feet - 3/8" standard,
         1/4" for floors
      c. 40 feet or more - 3/4" standard,

3/8" for floors

04. Variation in plan:
    a. 0 to 20 feet - 1/2"
    b. 40 feet or more - 3/4" standard,
       plus 1/2" for footings
05. Variation in eccentriCounty: - 2% for footings
06. Variation in openings:
    a. Size - plus 1/8"
    b. Location - 1/4"

3.04 CONSTRUCTION AND CONTROL JOINTS IN FLAT WORK

A. Provide construction joints as shown on drawings, at the end of all pours, where placing operations are stopped for 1/2 hour or more and in no case to exceed 30 feet in any direction. Construction joints shall be formed with a 2x4 tapered keyway. Reinforcing shall run through joint.

B. Architect/Owners Representative may direct additional control joints to be cut in concrete slabs after approximately two (2) weeks curing time if the concrete shows evidence of cracking. Joints shall be saw cut and shall be 1/3 the depth of the slab.

C. Provide expansion joints where exterior slabs abut a wall or other fixed object or at intervals not to exceed 30 feet. Expansion joint filler material shall be placed at its top 1/4" below the finished surface of the concrete and the edge of the concrete shall be eased with a rounding tool. When concrete has cured top of joint shall be sealed with joint sealer installed as per manufacturer's instructions.

3.05 PROTECTION IN COLD AND FREEZING WEATHER

A. In cold weather, concrete shall be mixed and placed only when the temperature is 40^{o}F, and rising, unless permission for placement of concrete is obtained from the Architect/Owners Representative. In freezing weather, the mixing water and aggregates shall be heated, and freshly placed concrete shall be protected by adequate housing of cover and heating.

B. Contractor shall have on job, ready to install, adequate equipment for heating the materials and freshly placed concrete and for enclosing work in accordance with requirements specified herein.

C. Concrete when placed in the form shall have a temperature of not less than 60^{o}F. Concrete and the surrounding air shall be maintained at a temperature of 50^{o}F, or greater for a period of 7 days immediately after placing. The method of protection and curing shall be such as to prevent evaporation of moisture from the concrete for a period of not less than 7 days.

D. Heat shall be removed gradually from the concrete to avoid thermal shock. Covering shall be left in place until concrete reaches surrounding outside temperature.

E. Salts, chemicals or other foreign materials shall not be mixed with the concrete to prevent freezing. Concrete work which has been damaged by freezing will be rejected.

3.06 CURING

A. All concrete shall be protected from premature drying and freshly placed concrete shall be protected against wash by rain, flowing water, freezing, mechanical injury, etc.

B. Concrete of walls, piers, etc., shall be cured by leaving the forms in place as long as possible, 2 DAYS MINIMUM.

C. Exposed concrete floor slabs, etc, shall be cured by covering with the specified, or approved curing agent.

3.07 REMOVAL OF FORMS

A. Forms shall be removed in such a manner as to insure the complete safety of the structure. Footing and foundation wall forms may be removed after 48 hours, providing the concrete is sufficiently hard to not be damaged thereby.

B. The Contractor shall assume responsibility for all damage due to the removal of the forms. It shall be contractor's duty to consult with the Architect/Owners Representative before the removal of any forms.

3.08 SURFACE FINISH OF CONCRETE (EXCEPT FLOORS)

A. Immediately after removing forms, remove all projections, loose materials, and cut back all metal form ties, and point up all voids with cement mortar, 1:2 mix. Rub areas thus repaired with carborundum to a smooth, even finish to match adjacent surfaces.

B. All formed concrete exposed to view, whether painted or unpainted, shall be finished in the manner noted above.

END OF SECTION

SECTION 09900
PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. WORK INCLUDED:

1. Provide and install all materials, labor, equipment and service to complete painting work, including all the required scaffolding and preparation.
2. Paint all new surfaces except those that are prefinished at factory unless directed otherwise by Owner's Representative.
3. Furnish and apply painter's finish to new exterior not specifically excepted.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Unless otherwise specified, materials shall be selected from the following manufacturers: Fuller-O'Brien, Glidden, Pittsburgh, Sherwin-Williams, Frazee, and Sinclair.

B. Only pure, unadulterated, first quality materials are permitted. When manufacturer makes more than one quality of product, use only his best quality. Undercoats are to be of same manufacture as approved final coat.

2.02 COLORS:

A. Colors shall be as noted on Drawings or Schedules or will be selected by Owner’s Representative. The proposal and acceptance of any paint manufacturer shall not restrict the Owner’s Representative to selection of standard colors of that manufacturer.

B. Finish coat colors shall be factory mixed; no job "mixing and matching" permitted.

C. Unless specifically noted otherwise, colors will not be changed within a surface plane.

2.03 LIFE OF FILM: The color of surfaces finished under this Section shall, at the end of one year, remain free from serious fading and the variation, if any, shall be uniform. The original adherence of materials shall be maintained for one (1) year and during this period, there shall be no evidence of any blisters, running, peeling, scaling, chalking, streaks or stains. Washing with alkali-free soap and water shall remove surface dirt without producing the above or other deteriorating effects.

PART 3 - EXECUTION

3.01 PREPARATION:

A. GENERAL: Surfaces to receive painter's finish shall be thoroughly cleaned of dirt, oil, grease, rust, loose coatings, scaling or chalking paint and any other deleterious matter or contamination which would adversely affect adhesion, protective properties or appearance of coatings. It shall be Contractor's responsibility to use whatever methods are required in cleaning surfaces, including the use of wire brushing, sanding, burning, scraping, sandblasting, washing and/or steam cleaning, to ensure that the paint finish adheres properly and that complete coverage is obtained.

3.02 APPLICATION:

A. Apply material evenly, smooth (non-textured), free of sags, runs, crawls, brush marks, according to manufacturer's directions. Do not apply paint under damp or humid conditions or when temperature is less than or is likely to fall below 50^{o}. Apply each coat at manufacturer's recommended consistency. Vary slightly color of successive coats. Allow each coat to dry before succeeding coat is applied. Paint to sharp, true lines and edges. Covering shall be complete. Tint base coats toward finish coat to facilitate coverage. When color, stain, dirt or undercoats show through the final coat of finish, additional finish coats shall be applied until coverage is complete and the finish is of uniform color and appearance.

B. Verify shop prime coat material and use compatible finish coat material.

3.03 TOUCH-UP AND CLEANING:

A. TOUCH-UP: Prior to acceptance of project, inspect painted surfaces and touch-up or refinish as required, abraded, stained or disfigured coatings. Costs of such touch-up shall be borne by trade causing the damage.

B. CLEANING: Remove spatters, spots and blemishes caused by work of this Section from surfaces throughout the project.

3.03 EXTERIOR PAINT SCHEDULE:

A. GENERAL: Provide the following paint systems for the various substrates, as indicated.

B. FERROUS METAL:

01. Ferrous Metals, Exterior: Prime + 2 coats urethane enamel.

END OF SECTION