DTA OPERATIONS CENTER PARKING LOT

DULUTH TRANSIT AUTHORITY

PROJECT MANUAL

April 11, 2023

Prepared by:
LHB, INC.
21 West Superior Street, Suite 500
Duluth, MN 55802
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LHB Project No. 190728

SECTION 00 0101

PROJECT TITLE PAGE

PROJECT:

DTA Operations Center Parking Lot

Duluth, Minnesota

PROJECT MANUAL

FOR

190728 DTA OPERATIONS CENTER PARKING LOT

OWNER:

Duluth Transit Authority

2402 West Michigan Street

Duluth, Minnesota 55806

Contact: Nancy Brown, Procurement Manager
Phone: 218.623.4329
E-mail: nbrown@duluthtransit.com

DESIGN TEAM:

LHB

21 West Superior St, Ste 500

Duluth, MN 55802

218.727.8446

Main Contact: Aaron Kelly, Project Manager/Architect
Phone: 218.279.2404
E-mail: aaron.kelly@lhbcorp.com

Landscape Architect: Mark Anderson
Phone: 218.279.2411
E-mail: mark.anderson@lhbcorp.com

Civil Engineer: Dan Shaw
Phone: 218.279.2467
E-mail: dan.shaw@lhbcorp.com

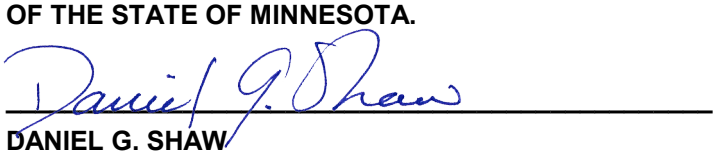
END OF SECTION

SECTION 00 0105

CERTIFICATIONS PAGE

CIVIL ENGINEER

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.



DANIEL G. SHAW

REG #41423 **DATE: 04/11/2023**

LANDSCAPE ARCHITECT

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

MARK S. ANDERSON

REG #12553 **DATE: 04/11/2023**

END OF SECTION

SECTION 00 0110
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END OF SECTION

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: DTA Operations Center Parking Lot.

B. Owner's Name: Duluth Transit Authority.

C. Architect's Name: LHB Inc.

1.02 DEFINITIONS

A. The word "Owner" refers to Duluth Transit Authority.

B. The word "Contractor" refers to a party or parties entering into a contract with Duluth Transit Authority.

C. The word "Work" refers to the specified undertaking, including the labor, materials, apparatus, equipment, etc., required in that connection.

D. The words "Architect/Engineer" refers to LHB Inc., 21 W. Superior Street, Suite 500, Duluth, MN 55802, phone (218) 727-8446.

1.03 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract as described in the Owner's Contract Documents.

1.04 DESCRIPTION OF ALTERATIONS WORK

A. Scope of alterations work is indicated on drawings.

1.05 GENERAL

A. All Articles in the Owner's Procurement Requirements are applicable to all Divisions and Sections of the work included herein. The conditions of the Contract, General and Supplementary General Conditions, and these General Requirements shall apply with equal force and effect to the Contractor and subcontractors engaged in this work.

B. Sequence of operations or place of commencement may be determined by the Architect/Engineer as deemed to best serve the needs and convenience of the Owner, or as necessity of occasion requires.

C. The Architect and his/her representatives, and designated representatives of the Owner shall have access to the construction site at all times. Contractor shall give Architect sufficient advance notice of when work specifically requiring Architect/Engineer approval will be done to avoid delaying the work.

1.06 WORK BY OWNER

A. Owner will award a contract for supply and installation of automatic gates, vehicle loop detectors, controls, card readers and associated equipment. Work may occur concurrent with this work, and shall be coordinated with General Contractor.

1.07 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent spaces during the entire construction period.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.08 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.
   1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Contractor to coordinate location for storage, trailers, and equipment with Owner.

E. Time Restrictions:
   1. Limit conduct of especially noisy work to early monrning, evenings or weekends as approved by Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Engineer for approval.

B. Forms filled out by hand will not be accepted.

C. Submit a printed schedule in Electronic Format (PDF) on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.

D. Submit Schedule of Values in Electronic Format (PDF) within 10 days after date of Owner-Contractor Agreement.

E. Revise schedule to list approved Change Orders, with each Application For Payment.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Engineer for approval.

C. Forms filled out by hand will not be accepted.

D. Present required information on electronic media printout.

E. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

I. Submit (1) PDF copy of each Application for Payment.

J. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 01 3000.

K. When Engineer or requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Price or Contract Time, Engineer will issue instructions directly to Contractor.

B. Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on Architect's Standard ASI Format.

C. For other required changes, Engineer will issue in Electronic Format (PDF) a Construction Change Directive (CCD) document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

D. For changes for which advance pricing is desired, Engineer will issue in Electronic Format (PDF) a Proposal Request (PR) that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, an area to indicate a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 5 days.

E. Contractor may propose a change by submitting in Electronic Format (PDF) a written request for change to Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.

F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
   1. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Engineer.
   2. For change ordered by Engineer without a quotation from Contractor, the amount will be determined by Engineer based on the Contractor's substantiation of costs as specified for Time and Material work.

G. Substantiation of Costs: Provide full information required for evaluation.
   1. Provide following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract will be at 1/2 the percentage allowed for additions.
      f. Break down of rates for self-performed work, and related overhead and profit associated with this work.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
   3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
   4. Insurance and Bond costs are included in the above Overhead and profit.

H. Execution of Change Orders: Engineer will issue Change Orders in Electronic Format (PDF) for signatures of parties as provided in the Conditions of the Contract on AIA A701.

I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

K. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 7000, Section 01 7800.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200
UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

C. Defect assessment and non-payment for rejected work.

1.02 COSTS INCLUDED

A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit including supervision and field personnel.

B. Unit Prices for Unforeseen Conditions shall include labor, materials, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the work, dewatering, shoring, overhead, profit, insurance, supervision and field personnel, to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the provisions of Section 00 7200 - General Conditions, and governing changes in the Work.

1.03 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.04 MEASUREMENT OF QUANTITIES

A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

B. Take all measurements and compute quantities. Measurements and quantities will be verified by Engineer.

C. For quantities of excavation, import or export of fill, aggregate or soils, verification shall be performed by the Geotechnical Engineer. Contractor shall keep records of load and weight tickets when available.

D. Assist by providing necessary equipment, workers, and survey personnel as required.

E. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

F. Measurement by Area: Measured by square dimension using mean length and width or radius.

G. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

H. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

I. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Engineer prior to starting work.

J. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

1.05 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Engineer, multiplied by the unit price.

B. Payment will not be made for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable.

2. Products determined as unacceptable before or after placement.
3. Loading, hauling, and disposing of rejected Products.

1.06 DEFECT ASSESSMENT

A. Replace Work, or portions of the Work, not complying with specified requirements.

B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Engineer will direct one of the following remedies:
   1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Engineer.
   2. The defective Work will be partially repaired to the instructions of the Engineer, and the unit price will be adjusted to a new unit price at the discretion of Engineer.

C. The authority of Engineer to assess the defect and identify payment adjustment is final.

1.07 SCHEDULE OF UNIT PRICES

A. Unit Prices for Unforeseen Conditions:
   1. Unit Price No. 1: Remove Unsuitable Material (off-site disposal):
      a. Includes: Removal of Unsuitable Material and legal off-site disposal.
      b. Measurement: Cubic Yard (in-place).
   2. Unit Price No. 2: General Fill (off-site borrow source):
      a. Includes: Subgrade preparation, and, supplying, importing, placing, and compacting soil material meeting the requirements for General Fill.
      b. Measurement: Cubic Yard (in-place).
   3. Unit Price No. 3: GranularFill (off-site borrow source):
      a. Includes: Subgrade preparation, and, supplying, importing, placing, and compacting soil material meeting the requirements for Granular Fill.
      b. Measurement: Cubic Yard (in-place).
   4. Unit Price No. 4: Sand (off-site borrow source):
      a. Includes: Subgrade preparation, and, supplying, importing, placing, and compacting soil material meeting the requirements for Sand.
      b. Measurement: Cubic Yard (in-place).
   5. Unit Price No. 5: Topsoil (loam) (off-site borrow source):
      a. Includes: Subgrade preparation, and, supplying, importing, placing, and compacting soil material meeting the requirements for Topsoil.
      b. Measurement: Cubic Yard (in-place).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2200

SECTION 01 2500
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

B. LHB Substitution Request Form

1.02 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

B. A Substitution Request for specified installer constitutes a representation that the submitter:

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
   1. **Complete LHB Substitution Request Form. Incomplete forms will not be considered.**

D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
   2. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
      a. Physical characteristics.
      b. In-service performance.
      c. Expected durability.
      d. Visual effect.
      e. Sustainable design features.
      f. Warranties.
      g. Other salient features and requirements.
      h. Include, as appropriate or requested, the following types of documentation:
         1) Product Data:
         2) Certificates, test, reports or similar qualification data.
      i. Impact of Substitution:

1) Savings to Owner for accepting substitution.
2) Change to Contract Time due to accepting substitution.

E. Limit each request to a single proposed substitution item.
1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Submittal Time Restrictions:

B. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.

C. Submittal Form (before award of contract):
1. Submit substitution requests by completing the form attached to this section. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Submittal Form (after award of contract):
1. Submit substitution requests by completing the form attached to this section. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.

B. Engineer will consider requests for substitutions only within 15 days after date of Agreement.

C. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
2. Without a separate written request.

3.04 RESOLUTION

A. Engineer may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Engineer will notify Contractor in writing of decision to accept or reject request.
1. Engineer's decision following review of proposed substitution will be noted on the submitted form.

3.05 ACCEPTANCE

A. Accepted substitutions during bidding period will be listed in Addenda. No further notification will be provided.

B. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 ATTACHMENTS

A. A copy of the Substitution Request Form required to be used on the Project is included after this section.

END OF SECTION

SUBSTITUTION REQUEST

Forms are due seven days prior to bid date. Incomplete forms will not be processed

Project Name: DTA Operations Center Parking Lot LHB Project No.: 190728
To: LHB
Attention: Dan Shaw
Email: dan.shaw@lhbcorp.com

Submitted By: _____ Date: _____

Section Number: _____ Paragraph: _____

Specified Product: _____

Proposed Product: _____

Reason For Substitution: _____

Description of Proposed Substitution *(Note: Limit this Request to one substitution)*

Manufacturer: _____ Trade Name: _____

Model Number: _____ Contact Person: _____

Phone Number: _____

History: ☐ New Product ☐ 2 to 5 Years Old ☐ 5 to 10 Years Old ☐ More than 10 Years Old

Attach complete technical data, literature and sample, if applicable

1. Does proposed substitution fail to satisfy, in any respect, characteristics specified for original product(s)? ☐ Y ☐ N
2. Does substitution affect dimensions shown on Drawings? ☐ Y ☐ N
3. Does substitution affect other parts of the Work (schedule, warranty, etc.) ☐ Y ☐ N
4. Does substitution affect cost to Owner? ☐ Y ☐ N
   a. If so, how much? Add $_____ Deduct $_____
5. If you indicated "Yes" to any of the items above, provide the following explanation:
6. Explain any difference between proposed substitution and specified product.
7. Summarize experience with product and manufacturer in Project area.

Contractor's Certification

The undersigned states, proposing this Substitution, certifies the following as true and correct and accepts all conditions relating to this request:

- This Substitution has been fully investigated and determined to be equal or superior in all respects.
- The same warranty will be furnished.
- The same maintenance service and source of replacement parts, as applicable, is available.
- The change to the Construction Progress Schedule is unchanged.
- The cost data as stated above is complete. All claims for any additional costs related to this Substitution does not affect dimensions or functional clearances.
- The Substitution does not affect dimensions or functional clearances.
- All Architectural/Engineering design fees associated with the review, evaluation, and or design and detailing changes as a result of this Substitution Request are the responsibility of the Contractor. The amount of these fees will be deducted from the Contract Sum due to the Contractor.
- Coordination, installation, and changes to the Work as necessary for an accepted Substitution will be complete in all respects.

Submitted By: _____

Signature: _____

Firm: _____

Address: _____

Telephone: _____

For Use By Architect / Engineer

☐ Substitution Recommended: Make submittals in accordance with Specifications.

☐ Substitution Recommended as Noted: Make submittals in accordance with Specifications.

☐ Substitution Rejection Recommended: Use specified products. Architect shall not be held responsible for the performance of any substitution accepted or approved by Owner over the recommendation of the Architect (Release and Indemnification Agreement between Owner and Architect required).

☐ Substitution Request received after deadline: Use specified products.

☐ Substitution Request returned: Incomplete submittal, use specified products.

Comments:

Signature: _____ Date: _____

NOTE: If approved, LHB will include product approval in Addendum

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittal service.

B. Preconstruction meeting.

C. Progress meetings.

D. Submittals for review, information, and project closeout.

E. Requests for Interpretation (RFI) procedures.

F. Submittal procedures.

1.02 PROJECT COORDINATOR

A. Project Coordinator: Owner's Representative.

B. During construction, coordinate use of site and facilities through the Project Coordinator.

C. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.

D. Make the following types of submittals to Engineer:
   1. Requests for Interpretation.
   2. Requests for substitution.
   3. Shop drawings, product data, and samples.
   4. Test and inspection reports.
   5. Design data.
   6. Manufacturer's instructions and field reports.
   7. Applications for payment and change order requests.
   8. Progress schedules.
   9. Coordination drawings.
   10. Correction Punch List and Final Correction Punch List for Substantial Completion.
   11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via e-mail to the Architect.
   1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
   2. Contractor and Engineer and Owner are required to follow this protocol.
   3. It is Contractor's responsibility to submit documents in allowable format.
   4. Contractor, subcontractors, suppliers, and Engineer's consultants will be permitted to use the service at no extra charge.
   5. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com).
   6. Paper document submittals will not be reviewed. It is the Contractor's responsibility to submit documents in PDF format.

7. All other specified submittal and document transmission procedures apply, physical samples or color selection charts shall be submitted in PDF format in addition to submission of physical sample to the Architect.
8. Physical samples required for color selection or color selection charts shall be scanned into PDF format and submitted for approval via the Electronic Document Submittal Service.

B. Submittal Service through Architect: The selected service is:
1. Newforma.

C. Project Closeout: Engineer will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

A. Engineer will schedule a meeting after Notice of Award.

B. Attendance Required at Preconstruction Meeting:
1. Owner.
2. Engineer.
3. Contractor.

C. Agenda:
1. Identification of main contacts and lines of communication
2. Submission of list of Subcontractors, schedule of values, and progress schedule.
3. Submission of initial Submittal schedule.
4. Designation of personnel representing the parties to Contract, Contractor and Engineer.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
6. Site mobilization, administrative requirements, Owner requirements.

D. Architect will Record minutes and distribute via e-mail after meeting. Distribution to subcontractors shall be the responsibility of the Contractor.

3.03 PROGRESS MEETINGS

A. Engineer will schedule and administer meetings throughout the progress of the Work.

B. Attendance Required:
1. Contractor.
2. Owner.
3. Engineer.
4. Contractor's superintendent.
5. Major Subcontractors and suppliers.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Review of submittals schedule and status of submittals.
5. Review of off-site fabrication and delivery schedules.
6. Maintenance of progress schedule.
7. Planned progress during succeeding work period.
8. Other business relating to work.

D. Architect will Record minutes and distribute via e-mail after meeting. Distribution to subcontractors shall be the responsibility of the Contractor.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

3.05 REQUESTS FOR INTERPRETATION (RFI)

A. Definition: A request seeking one of the following:
   1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.

B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
   1. Prepare a separate RFI for each specific item. Number sequentially.
      a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
      b. Do not forward requests which solely require internal coordination between subcontractors.
   2. Combine RFI and its attachments into a single electronic file pdf format and submit via e-mail to the Architect

C. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
   1. Discrete and consecutive RFI number, and descriptive subject/title.
   2. Issue date, and requested reply date.
   3. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
   4. Annotations: Field dimensions and/or description of conditions which have engendered the request.
   5. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.

D. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

E. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

3.06 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit for review through submittal service:
   1. Product data.
   2. Shop drawings.
   3. Warranty.
   4. Calculations.
   5. Schedules.
   6. Samples for selection - scanned image.
   7. Samples for verification - scanned image.

B. Provide quantity and size of physical samples as specified in individual sections. Physical samples shall be delivered to the Architect's office.
   1. Samples for selection.
   2. Samples for verification.

C. Submit to Engineer for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.

D. Samples will be reviewed for aesthetic, color, or finish selection.

E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Procedures and Submittals.

3.07 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them in PDF format via submittal service:
   1. Design data.
   2. Certificates.
   3. Test reports.
      a. Classify each inspection and test report as being either "shop drawings" or "product data" depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Engineer's knowledge as contract administrator or for Owner.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them in PDF format:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.

D. Submit for Owner's benefit as specified in Section 01 7000.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Engineer.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Coordinate the preparation and processing of submittals with the performance of the Work. Coordinate submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity. The Architect reserves the right to withhold action on any submittal requiring coordination with other related submittals.
   2. Prepare and transmit each submittal to the Architect sufficiently in advance of the scheduled performance of related work and other applicable activities. Allow sufficient time (minimum of 2 weeks) so that the installation will not be delayed as a result of the time required to properly process submittals, including time for resubmittal, if necessary.

Advise the Architect on each submittal if the Work would be expedited if processing time could be shortened. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect sufficiently in advance of the Work.

3. Use a separate transmittal for each item.
4. Submittals not requested will be recognized, and will be returned "Not Reviewed",

B. Product Data Procedures:
   1. General: Product data includes standard printed information on manufactured products that has not been specially prepared for this project. Information required specifically as product data includes manufacturer's standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies and the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirement for interfacing the material, product or system with other work.
   2. Submit only information required by individual specification sections.
   3. Collect required information into a single submittal.
   4. Mark the submittal to show which choices and options are applicable to the project. Where product data includes information for several similar products, some of which are not required for use on the project, mark the submittal to show clearly that such information is not applicable.

C. Shop Drawing Procedures:
   1. General: Information required on shop drawings includes dimensions, identification of specific products and materials which are included in the Work, compliance with specified standards and notations of coordination requirements with other work. Provide special notation of dimensions that have been established by field measurement. Highlight, encircle or otherwise indicate deviations from the contract documents on the shop drawings.
   2. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
   3. Provide coordination drawings where required for the integration of the Work, including work first shown in detail on shop drawings or product data. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided or function as indicated. Coordination drawings are considered shop drawings and must be definitive in nature.
   4. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
   5. All exterior materials to be submitted prior to review of any exterior materials. All interior materials to be submitted prior to review of any interior materials.

D. Samples Procedures:
   1. Transmit related items together as single package.
   2. Samples are physical examples of work. Documentation required specifically for sample submittals includes a generic description of the sample, the sample source or the product name or manufacturer, compliance with governing regulations and recognized standards. In addition, indicate limitations in terms of availability, sizes, delivery time, and similar limiting characteristics.
   3. Submit samples for the Architect's visual review of general generic kind, color, pattern, and texture, and for a final check of the coordination of these characteristics with other related elements of the Work. Samples are also submitted for quality control comparison of these characteristics between the sample submittal and the actual work as it is delivered and installed.
   4. Provide samples that are physically identical with the proposed material or product to be incorporated in the Work.
   5. Provide full scale, fully fabricated samples cured and finished in the manner specified. Where variations in color, pattern, or texture are inherent in the material or product

represented by the sample, submit multiple units of the sample (not less than three units), that show the approximate limits of variances.

6. Where samples are specified for the Architect's selection of color, texture or pattern, request that the Architect provide a list of sample choices to be sent to the Architect for review.

E. Mock-Ups:
   1. Mock-ups are special forms of samples which are too large or otherwise inconvenient for handling in the manner specified for transmittal of sample submittals. Mock-ups and similar samples specified in individual work sections are special types of samples.
   2. Comply with sample submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

F. Transmit each submittal with a copy of approved submittal form.

G. Contractor shall ensure that they are able send and receive large file size (ie. 50 MB) documents electronically.

H. Schedule submittals to expedite the Project, and coordinate submission of related items.

I. Transmit each submittal with approved form. Reference Specification Section Number and description of submittal on each transmittal.

J. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

K. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

L. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals without the Contractor's stamp will not be reviewed by the Architect/Engineer.

M. Schedule submittals to expedite the Project, and coordinate submission of related items.

N. For each submittal for review, allow 14 calendar days for review at Architect/Engineer's office.

O. Identify variations, including minor variations and limitation, from Contract Documents and Product or system, if any, that may be detrimental to successful performance of the completed Work.

P. Provide space for Contractor and Engineer review stamps.

Q. When revised for resubmission, identify all changes made since previous submission.

R. Re-submittals beyond one will result in additional services by the Architect/Engineer and a deduct change in the contract amount to cover the cost of services.

S. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

T. Submittals not requested will not be recognized or processed.

3.11 MISCELLANEOUS SUBMITTALS

A. Warranties: Furnish two executed copies of warranties, bonds or agreements. Provide two additional copies where required for maintenance agreements.

B. Standards: Where submittal of a copy of standards is indicated, and except where copies of standards are specified as an integral part of a "Product Data" submittal, submit an electronic copy of the standard for the Architect's use. Where workmanship, whether at the project site or elsewhere is governed by a standard, furnish copies of the standard to fabricators, installers and others involved in the performance of the Work.

C. Record Documents: Furnish sets of original documents as maintained by the Contractor on the project site including a copy of approved shop drawings.

D. Operating and Maintenance Data: Furnish two bound copies of operating data and maintenance manuals to the Owner.

3.12 ARCHITECT'S ACTION

A. Action Stamp:
   1. Architect, and the Architect's Consultants/Engineers will stamp each submittal to be returned with a uniform, self-explanatory action stamp, appropriately marked and executed to indicate whether the submittal returned is for unrestricted use, final-but-restricted use (as marked), must be revised and resubmitted (use not permitted) or without action (as explained on the transmittal form).
   2. Submittals not required by contract documents will be returned without action.

B. Returned for Resubmittal:
   1. Where the submittal is returned for correction and resubmittal, do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity.
   2. Revise the submittal or prepare a new submittal in accordance with the Architect's and/or the Architect's Consultants/Engineers notations stating the reasons for returning the submittal; resubmit the submittal without delay. Repeat if necessary to obtain a different action marking.
   3. Do not permit submittals with this type of marking to be used at the project site, or elsewhere where work is in progress.

3.13 ELECTRONIC (AUTOCAD) DRAWING FILES

A. Architect will provide contractors with electronic drawing files, .DWG format of plan views only, upon the following conditions:
   1. Architect obtains approval from Owner.
   2. Architect Limited License Agreement prepared and signed by Architect and contractor.
   3. Electronic drawing files will be provided in .DWG format. Contractor assumes the responsibility and the risk of conversion into another format.

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. Testing and inspection agencies and services.

C. Control of installation.

D. Defect Assessment.

1.02 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).

B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1. Submit a certified written report of each inspection, test or similar service directly to the Architect via Submittal Service. Submit copies of each written report directly to the governing Agency, when the Agency so directs.

1.04 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Contractor shall employ and pay for services of an independent testing agency to perform all specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:

1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
2. Laboratory: Authorized to operate in State in which Project is located.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Engineer.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide direct access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Engineer.

E. Re-testing required because of non-comformance to specified requirements shall be paid for by Contractor.

F. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.03 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Engineer, it is not practical to remove and replace the work, Engineer will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary Controls: Barriers, enclosures, and fencing.

C. Vehicular access and parking.

D. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES/UTILITY SHUTDOWNS

A. Owner will provide the following:
   1. Electrical power, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.

B. Existing facilities may not be used.

1.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities is not permitted.

C. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 FENCING

A. Construction: Contractor's option.

1.06 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.07 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access with Owner.

1.08 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

1.09 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5713

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 REFERENCE STANDARDS

A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014.

B. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2017.

C. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015.

D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2016.

F. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2017.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

PART 2 PRODUCTS

2.01 MATERIALS

A. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
   1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
   2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491/D4491M.
   3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
   4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
   5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
   6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533/D4533M.
   7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

B. Silt Fence Posts: One of the following, minimum 5 feet long:
   1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.

2. Hardwood, 2 by 2 inches in cross section.

C. Gravel: See Section 32 1123 for aggregate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 50 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
   2. Space sediment barriers with the following maximum slope length upslope from barrier:
      a. Slope of Less Than 2 Percent: 100 feet..
      b. Slope Between 2 and 5 Percent: 75 feet.
      c. Slope Between 5 and 10 Percent: 50 feet.
      d. Slope Between 10 and 20 Percent: 25 feet.
      e. Slope Over 20 Percent: 15 feet.

D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
   1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
   2. Straw bale row blocking entire inlet face area; anchor into pavement.

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.

G. Soil Stockpiles: Protect using one of the following measures:
   1. Cover with polyethylene film, secured by placing soil on outer edges.
   2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

H. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.

I. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:
   1. Excavate minimum of 6 inches.
   2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
   3. Place and compact at least 6 inches of 1 1/2 to 3 1/2 inch diameter stone.

B. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D4873/D4873M.

2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
5. Install with top of fabric at nominal height and embedment as specified.
6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
7. Fasten fabric to wood posts using one of the following:
    a. Four nails per post with 3/4 inch diameter flat or button head, 1 inch long, and 14 gauge, 0.083 inch shank diameter.
    b. Five staples per post with at least 17 gauge, 0.0453 inch wire, 3/4 inch crown width and 1/2 inch long legs.
8. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
9. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:
    1. Promptly replace fabric that deteriorates unless need for fence has passed.
    2. Remove silt deposits that exceed one-third of the height of the fence.
    3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Transportation, handling, storage and protection.

B. Product option requirements.

C. Substitution limitations.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named 10 days prior to bidding.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. See Section 01 2500 - Substitution Procedures.

B. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

C. Substitution Submittal Procedure (Prior to Bidding): Refer to Section 01 2500.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition.

C. Cutting and patching.

D. Cleaning and protection.

E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

1.04 PROJECT CONDITIONS

A. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

B. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

D. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.05 COORDINATION

A. See Section 01 1000 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

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

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

D. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Engineer before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items as required for new construction and as indicated on drawings.
   2. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   3. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

C. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

D. Adapt existing work to fit new work:

E. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

F. Clean existing systems and equipment.

G. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

H. Do not begin new construction in alterations areas before demolition is complete.

I. Comply with all other applicable requirements of this section.

3.05 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

D. Execute cutting and patching to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.

E. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

F. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces if warranty of work is still in effect.

G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

H. Restore work with new products in accordance with requirements of Contract Documents.

I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

J. At penetrations of walls, partitions, ceiling, or floor construction, completely seal voids with sealant or fire rated material as required.

K. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

L. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

M. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.06 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.08 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Clean surfaces exposed to view; remove stains and foreign substances, polish transparent and glossy surfaces.

C. Clean site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.09 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Engineer.

B. Provide preliminary inspection and punchlist to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.

C. Notify Engineer when work is considered ready for Engineer's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Engineer's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Engineer's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Engineer.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Engineer when work is considered finally complete and ready for Engineer's Substantial Completion final inspection.

H. Complete items of work determined by Engineer listed in executed Certificate of Substantial Completion.

I. Comply with requirements identified in Section 01 7800.

END OF SECTION

SECTION 01 7800

CLOSEOUT PROCEDURES AND SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Warranties and bonds.

B. Forms Required at Project Closeout

1.02 PROJECT CLOSEOUT

A. Project closeout is the term used to describe certain collective project requirements, indicating completion of the Work that are to be fulfilled near the end of the Contract time in preparation for final acceptance and occupancy of the Work by the Owner, as well as final payment to the Contractor and the normal termination of the Contract. Specific requirements for individual units of work are included in the appropriate sections in Division 2 through 35.

1.03 TIME OF CLOSEOUT

A. Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout will be a single time period for the entire Work that is certified as substantially complete and for which final certification of occupancy has been issued by the City at different dates.

1.04 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. General: Complete the following before requesting the Architect's inspection for certification of substantial completion. List known exceptions in the request.
   1. Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.
   2. Warranties (guarantees), maintenance agreements and similar provisions of contract documents. All warranties shall start on the date of Substantial Completion.
   3. Application for reduction (if any) of retainage, and consent of surety.
   4. Advise to Owner on coordination of shifting insurance coverages, including proof of extended coverages as required.
   5. Listing of Contractor's incomplete work, recognized as exceptions to Architect's Certificate of Substantial Completion.
   6. Removal of temporary facilities, services, surplus materials, rubbish and similar elements.

B. Progress Payment: In the progress payment request that coincides with, or is the first request following, the date substantial completion is claimed, show either 100% completion for the portion of the Work claimed as "substantially complete", or list incomplete items, the value of incomplete work, and reasons for the Work being incomplete.

C. Submittals: Submit along with the progress payment, the following items:
   1. Supporting documentation for completion as indicated in these contract documents.
   2. A statement showing an accounting of changes to the Contract Sum.
   3. Record drawings, maintenance manuals, and similar final record information.

D. Work to be completed: Complete the items in order for the Work to be "substantially complete".
   1. Touch-up and otherwise repair and restore marred exposed finishes.
   2. Do final cleaning.

1.05 INSPECTION FOR SUBSTANTIAL COMPLETION

A. Upon receipt of the Contractor's request, the Architect will proceed with inspection. The Owner will also inspect the Work. The Contractor shall inspect all building areas for similar deficiencies or conditions noted by the architect for compliance with the contract. Following the inspection, the Architect will either prepare the certificate of substantial completion or will advise the Contractor of work which must be performed before the certificate will be issued. Contractor will submit a list of incomplete items with request.

B. Issue of "Certificate of Substantial Completion": When the Work, in the Architect's judgment, has progressed to the point where only minor corrective actions are necessary and the final

certificate of occupancy has been issued by the City, the Architect will issue a certificate of substantial completion. The certificate shall be AIA Document G704, Certificate of Substantial Completion, and latest edition. The certificate may include attached documents such as a "punch-list" for final acceptance, requirements of work that are incomplete and of obligations that have not been fulfilled but are required for final acceptance. Failure to include items on such lists does not alter the responsibility of the Contractor to complete all work in accordance with the contract documents.

1.06 PREREQUISITES TO FINAL ACCEPTANCE

A. Procedures: Complete the following before requesting the Architect's certification of final acceptance and final payment as required by the General Conditions. List known exceptions, if any, in the request.
   1. Remove temporary protection devices and facilities.
   2. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
   3. Submit a copy of the Architect's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
   4. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   5. Submit final meter reading for utilities and similar data either as of the date of substantial completion or else when the Owner took possession of and responsibility for corresponding elements of the Work.
   6. Submit assurance, satisfactory to Owner that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.
   7. Submit proof, satisfactory to Owner, that taxes, fees and similar obligations of Contractor have been paid. (AIA document G706 and 706A)
   8. Changeover of door locks and other Contractor's access provisions to Owner's property.
   9. Submit lien waivers from Contractor, Subcontractors and material suppliers in the full amount of the contract.
   10. Contractor shall satisfy requirements for site area restoration, street maintenance and repair.

1.07 SUBMITTALS

A. Upon Substantial Completion, conduct Contractor Punchlist and submit to Architect for review.

B. Project Record Documents: Submit documents to Engineer two-weeks prior to claim for final Application for Payment.

C. Warranties and Bonds

D. Forms Required Prior to Final Payment:
   1. Contractor must submit a complete "AIA G706 Contractor's Affidavit of Debts and Claims" and AIA G706A Contractor's Affidavit of Release of Liens attached at the end of this section.
   2. Contractor must submit a complete "AIA G707 Consent of Surety to Final Payment" on the form attached at the end of this section.
   3. Contractor must submit a complete Certificate of Completion and Release attached at the end of this section.
   4. Contractor must submit a complete "IC-134 Withholding Affidavit for Contractors" or Exemption from Surety for Non-Minnesota Contractors SE-E" on forms attached at the end of this section as required by the Minnesota Department of Revenue. Unless otherwise stipulated in the Contract, for purposes of final payment, 5% of the total contract amount will be retained pending the receipt of a fully executed IC-134.
   5. Contractor must submit letter and collect letter from all subcontractors documenting MN sales tax paid for materials purchased related to the Project. Example provided at the end of this section.

6. Contractor must submit City of Duluth Permits and documentation of final passing inspections for primary Contractor and all subcontractors.
7. Contractor must submit lien waivers from all subcontractors and primary Contractor.

END OF SECTION

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. Remove all paving and curbs as indicated on drawings. Sawcut paving where indicated. Mill pavement to depth to allow overlay pavement thickness in areas indicated in the plans.

B. Remove other items indicated, for salvage, relocation, and recycling.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 1000

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 REFERENCE STANDARDS

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

B. ACI 301 - Specifications for Structural Concrete; 2016.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).

D. ACI 347R - Guide to Formwork for Concrete; 2014, with Errata (2017).

E. PS 1 - Structural Plywood; 2009 (Revised 2019).

1.03 DESIGN REQUIREMENTS

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

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

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

B. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.

B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

C. Store products under cover to protect from oil, dirt, and sunlight.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of walls.

D. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

2.02 WOOD FORM MATERIALS

A. Rough Form Finish Concrete: Any standard form material that produces sound structural concrete.

B. Smooth Form Finish Concrete: Materials selected to offer optimum smooth, stain-free final appearance and minimum number of joints. Provide materials with sufficient strength to resist hydrostatic head without bow or deflection in excess of allowable tolerances and as follows:
   1. Softwood Plywood: PS 1, B-B High Density Concrete Form Overlay, Class I, Exterior Grade, mill-oiled and edge-sealed.

2.03 REMOVABLE PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gauge, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

2.04 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
   1. Composition: Colorless mineral oil-based compound.

C. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

D. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 EARTH FORMS

A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on drawings.

F. Coordinate this section with other sections of work that require attachment of components to formwork.

G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Engineer before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

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

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

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

3.07 FORMWORK TOLERANCES

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

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2016.

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).

C. ACI SP-66 - ACI Detailing Manual; 2004.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

E. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2017.

F. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2015.

G. CRSI (DA4) - Manual of Standard Practice; 2009.

H. CRSI (P1) - Placing Reinforcing Bars; 2011.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, location of splices, and elevations of each wall.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, and ACI SP-66.

B. Reinforcing materials will be verified by Owner's representative in accordance with Section 01 4000.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
   1. Deformed billet-steel bars.
   2. Unfinished, except as noted.
   3. Epoxy coated in accordance with ASTM A775/A775M.

B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
      a. Precast concrete blocks of strength equal to or greater than specified strength of concrete or Class 3 supports equipped with sand plates, where concrete will be cast against earth. Concrete masonry units will not be acceptable.
   3. Provide plastic or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.
   4. Epoxy Coating Repair Compound: Meeting ASTM A775/A775M with minimum 70 percent solids.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted, unless specifically noted on the Drawings.

C. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. All reinforcement, including welded wire fabric to be supported.

B. Repair epoxy coating with epoxy coating repair compound. Follow manufacturer's recommendations.

C. Accommodate placement of formed openings.

D. Comply with ACI 318 code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 4000, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Elevated concrete slabs.

B. Concrete foundation walls and concrete grade beams.

C. Joint devices associated with concrete work.

1.02 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Structural Concrete; 2016.

C. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

E. ACI 305R - Guide to Hot Weather Concreting; 2010.

F. ACI 306R - Guide to Cold Weather Concreting; 2016.

G. ACI 308R - Guide to External Curing of Concrete; 2016.

H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2017b.

K. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements; 2020.

L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.

M. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2020a.

N. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

O. ASTM C150/C150M - Standard Specification for Portland Cement; 2017.

P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

Q. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

R. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.

S. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

T. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.

U. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.

V. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2020.

W. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

X. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars; 2018a.

Y. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011 (Reapproved 2016).

Z. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Samples: Submit two, 12 inch long samples of waterstops and construction joint devices.

E. Test Reports: Submit report for each test or series of tests specified.

F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.04 QUALITY ASSURANCE

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

B. Acquire cement from same source and aggregate from same source for entire project.

C. Follow recommendations of ACI 305R when concreting during hot weather.

D. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

A. Cement:
   1. Portland Cement: ASTM C150/C150M, Type I - Normal.
   2. Blended Hydraulic Cement: ASTM C595/C595M, Type IL - Portland-Limestone.
   3. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Fly Ash: ASTM C618, Class C or F.

D. Ground Granulated Blast Furnace Slag: ASTM C989/C989M, Grade 100 or 120.

E. Calcined Pozzolan: ASTM C618, Class N.

F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

G. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

D. Accelerating Admixture: ASTM C494/C494M Type C.

E. Retarding Admixture: ASTM C494/C494M Type B.

F. Water Reducing Admixture: ASTM C494/C494M Type A and/or Type F.

2.05 BONDING AND JOINTING PRODUCTS

A. Slab Isolation Joint Filler: 1/4 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, 1/4 inch thick and full depth of slab less 1/2 inch; tongue and groove profile.

2.06 CURING MATERIALS

A. Comply with requirements of Section 03 3900.

2.07 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.
   2. Where trial mixtures are used, they shall be completed, tested and approved by the Architect/Engineer prior to use in the field. Additional trial mixtures shall be required for all variations of mix components and admixtures.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete:
   1. Compressive Strength, Slump, Aggregates and Air: As noted on the Drawings.
   2. Admixtures: Add acceptable admixtures as recommended in ACI 211.1, as appropriate for environmental conditions, and at rates recommended by manufacturer.
   3. Fly Ash Content: Maximum 25 percent of cementitious materials by weight, except maximum 15 percent in floor slabs.
   4. Granulated Blast Furnace Slag Content: Maximum 50 percent of cementitious materials by weight, except maximum 15 percent in floor slabs.
   5. Total of Fly Ash and Granulated Blast Furnace Slag Combined: Maximum 50 percent of cementitious materials by weight, except maximum 15 percent in floor slabs.
   6. Water-Cement Ratio: Maximum 40 percent by weight.
   7. Maximum Aggregate Size: 5/8 inch.

2.08 CONTROL OF MIX IN THE FIELD

A. Slump: A tolerance of up to 1 inche above that specified will be permitted for one batch in five consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
   1. If slump upon arrival at the site is lower than 1 inch below the value specified, one addition of water in accordance with ASTM C94/C94M will be permitted to bring slump within tolerance, provided that:
      a. A positive means is available to measure the amount of water added at the site.
      b. The specified (or approved) maximum water-cement raio is not exceeded.
      c. Not more than 45 minutes have elapsed since batching.

2.09 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. Verify that forms are clean and free of rust before applying release agent.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

C. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Engineer not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 SLAB JOINTING

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Install joint devices in accordance with manufacturer's instructions.

E. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

F. Consolidate all concrete, including slabs, by vibrating.

G. Place concrete continuously between predetermined expansion, control, and construction joints.

H. Place slabs-on-grade to thickness noted on Drawings. Thicknesses noted are minimums, not averages.

I. Scree floors and slabs on grade level, or as noted on the Drawings, maintaining surface flatness as specified.

J. Do not interrupt successive placement; do not permit cold joints to occur.

3.05 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
   3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Light broom finish perpendicular to traffic direction for exterior slab surfaces.
   2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.06 CURING AND PROTECTION

A. Comply with requirements of Section 03 3900.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Independent testing agency to submit copies of concrete testing reports to the concrete producer/supplier in addition to the parties listed in Section 01 4000 - Quality Requirements.

C. Provide free access to concrete operations at project site and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

E. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

F. Test samples for pumped concrete shall be acquired at the discharge end of the hose.

G. Periodically verify proper concrete placement technique.

H. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cubic yards or less of each class of concrete placed.

I. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

J. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.08 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Engineer and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.09 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 03 3900
CONCRETE CURING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.02 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2016.

B. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

C. ACI 308R - Guide to External Curing of Concrete; 2016.

D. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.

E. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

F. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on curing compounds, moisture-retaining sheet, and polyethylene film, including compatibility of different products and limitations.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1R .

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver curing materials in manufacturer's sealed packaging, including application instructions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Membrane Curing, Sealing, and Dustproofing Compound: ASTM C309 Type 1 - Clear or translucent, Class A.
   1. Water-based, low VOC, acrylic copolymer solution.
   2. Manufacturers:
      a. Provide Dress & Seal WB 30 as manufactured by L&M Construction Chemicals (brand of Laticrete International, Inc.).
      b. Provide MasterKure CC 1315WB manufactured by Master Builders Solutions/BASF.
      c. Provide Ultra Seal EF manufactured by Dayton Superior.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Moisture-Retaining Sheet: ASTM C171.
   1. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd, 40 inches wide.

C. Polyethylene Film: ASTM D2103, 4 mil thick, clear.

D. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION - HORIZONTAL SURFACES

A. Cure floor surfaces and slabs on grade in accordance with ACI 302.1R and ACI 308R.

B. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for seven days.

C. Spraying: Spray water over floor slab areas and maintain wet for seven days.

D. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges; maintain in place for not less than seven days.

E. Absorptive Moisture-Retaining Sheet: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for seven days.

F. Membrane Curing Compound: Apply curing compound in accordance with manufacturer's instructions in two coats, with second coat applied at right angles to first.

3.03 EXECUTION - VERTICAL SURFACES

A. Cure surfaces in accordance with ACI 308R.

B. Spraying: Spray water over surfaces and maintain wet for seven days.

C. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in two coats, with second coat applied at right angles to first.

3.04 PROTECTION

A. Do not permit traffic over unprotected floor surface.

3.05 FIELD QUALITY CONTROL

A. Owner's representative will check maintenance of curing procedures in accordance with Section 01 4000.

3.06 SCHEDULES

A. Exposed concrete floors require a wet or moist cure method: ponding, spraying, moisture-retaining sheet or absorptive moisture-retaining sheet for a minimum 7 days. Followed by membrane curing compound installed per manufacturer's recommendations.

END OF SECTION

SECTION 30 1000

BASIC CIVIL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Governing Specification - Reference specification for civil work.

B. Utility Property and Service - Identifying and working around existing utilities.

C. Construction Surveying - Surveying necessary to perform the work.

1.02 RELATED SECTIONS

A. Section 01 7000 Execution and Closeout Requirements - Laying out the work.

B. Division 30 - 35 All Sections - Civil Specifications.

1.03 REGULATORY CODES

A. 29CFR1926. US Code of Federal Regulations-Safety and Health Regulations for Construction.

1.04 GOVERNING SPECIFICATION

A. The State of Minnesota Department of Transportation, Standard Specifications for Construction (MnDOT), current edition shall apply on all Division 30 through 35 work, except as modified or altered in the following sections: 30 0000 through 35 9999.

B. The City of Duluth Public Works & Utilities Department - Engineering Division current edition Standard Construction Specifications book, and any addendum or supplements shall apply on all work performed in the right-of-way, except as modified or altered in the following sections: 30 0000 through 35 9999.

C. City Engineers Association of Minnesota (CEAM) - Standard Specifications current edition.

D. All traffic control devices and signing shall conform to the 2014 Minnesota MUTCD, including the most current edition of the field manual. The Contractor is responsible for all traffic control on the Project.

E. All references to measurement and payment in the Governing Specifications shall not apply.

1.05 UTILITY PROPERTY AND SERVICE

A. Construction operations in proximity of utility properties shall be performed in accordance with the provisions of MnDOT 1507, except as modified below:

1. Interference of Underground Structures

   a. When any underground structure interferes with planned placement of the pipeline or appurtenances, to such an extent that alterations in the work are necessary to eliminate conflict or avoid endangering effects on either existing or proposed facilities, Contractor shall immediately notify Engineer of the affected structure. When any existing facilities are endangered by Contractor's operations, Contractor shall cease work associated with the interference and take such precautions as may be necessary to protect in-place structures until a decision is made as to how the conflict will be resolved.

   b. Without specific authorization from Engineer, no essential utility service shall be disrupted, nor shall any change be made in either the existing structures or the planned installations to overcome the interference. Alterations in existing facilities will be allowed only to the extent that service will not be curtailed unavoidably, and then only when the encroachment or relocation will satisfy all applicable regulations and conditions.

   c. Whenever alterations are required as a result of unforeseen underground interferences, not due to any fault or negligence of Contractor, Engineer will issue a written order covering any additional or extra work involved and specifying the revised basis of payment, if any. Any alterations made strictly for the convenience of Contractor shall be subject to prior approval and shall be at Contractor's expense.

1.06 CONSTRUCTION SURVEYING

A. GENERAL SURVEY SPECIFICATIONS
   1. This Contract provides for Contractor to accomplish Construction Surveying for this project. Furthermore, Contractor is advised that the Contract may not fully describe every detail or make specific allowances for all probable exceptions and contingencies related to Construction Surveying requirements for this Project.

B. SURVEYING TO BE PERFORMED BY OWNER'S ENGINEER
   1. The Owner's Engineer has set the initial horizontal and vertical control points in the field for the Project as indicated in the Plans. Upon request by the Contractor, the Engineer will also provide electronic data in the format that was used in the accomplishment of the surveys for the Construction Plan, and in Construction Plan development itself. However, due to the many different processes that the design survey data goes through and the large variety of sources of input in the final production of the Plan itself, no warrantee is made as to the value or adaptability of the electronic data to the Surveyor. No warrantee is made that the data systems used by the Engineer, or any consultants employed by the Owner for Surveying or Construction Plan preparation, will be compatible with the systems used by the Contractor's surveyor. Information shown on the printed "Plan" shall always govern over any electronic "Plan" data.
   2. At the discretion of the Owner's Engineer, spot checks may be performed upon the Contractor's surveying calculations, records, field procedures, and actual staking. If the Engineer determines that the work is not being performed in a manner that will assure proper controls and accuracy, the Engineer will order the Contractor to redo such work, to the standards specified in the Contract, at no additional cost to the Owner.

C. CONSTRUCTION SURVEYING BY THE CONTRACTOR
   1. Contractor Construction Surveying Requirements are as follows:
      a. Construction Surveying is defined as accurately providing all necessary computations, stakes and marks to establish lines, slopes, elevations, points, continuous profile grades and the requirements shown in the Plan for Construction Staking; so that the Contractor's forces are able to construct all the required work for the project in accordance with the Contract requirements; and so that the Owner's Engineers and Inspectors are able to complete all necessary inspection and Contract Administration duties. The staking shall include, but not be limited to clearing, grubbing, removals, grading, culverts, embankments, borrow, aggregate base course, pavements, buildings, utilities, signs, pavement parking, erosion control and turf establishment items to complete the Project as represented in the Plans. The surveying must be done in a way that is timely, and that is reflective of the continuing and ongoing nature of construction and inspection activities which will generally require frequent, separate Project visits by the Contractor's survey crew to the Project to accommodate the various stages of construction and inspection activities that will occur.
      b. The Surveyor shall be prepared to make all necessary surveying checks for field verification of actual conditions and shall make the necessary minor surveying and staking adjustments to fit the construction to actual field conditions. In addition, some Plan details may be dependent upon actual field conditions at the time of construction. It may be necessary to perform some field surveying or office computations in order to stake these components. All work referred to in this paragraph is considered part of the work of Construction Surveying and no additional payment will be made for this work.
      c. The Contractor shall:
         1) Be responsible for the preservation of all reference points, monuments, government land corners, horizontal and vertical control points, stakes, and marks that are established by the Engineer or others within the Project limits. If the Contractor or its surveyor fails to preserve these items, and if they must be re-established by the Owner, the Engineer will deduct a charge from monies due or becoming due the Contractor according to the Owner's costs.

2) Verify the original site control points provided on the plans by the Owner's surveyor. Any site control points subject to disturbance by the planned construction operations shall be transferred by the Contractor to an undisturbed location on the site or to an offsite location. Contractor shall preserve, protect and maintain a minimum of three site control points at all times throughout the duration of construction and for a period of one year following substantial completion of the project.
3) Start and end all level runs, traverses, or GPS control surveys from known control.
4) Perform all Construction Surveying.
5) Present the Engineer with the As-built Survey Data. The as-built survey data shall include the following:
   (a) Changes from the Plan:
      (1) Manhole and catch basin inverts and top of castings
      (2) Entrance floor elevations
      (3) Valve box covers
      (4) Fence and gate locations
   (b) Locations of utilities relocated or replaced as part of the Project.
   (c) Identify any alignment, property, or control monumentation destroyed or placed during the Project.
   (d) The information shall include the X, Y and if applicable, the Z coordinates in the Project datum. If the original item had no coordinate reference, then show the revised centerline station and offset.
6) Furnish survey documentation and as-built survey data to the Engineer within the time limits indicated in the surveying work schedule and prior to application for final payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

A. Comply with other requirements specified in Section 01 7000.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

A. Scope: Remove trees, shrubs, and stumps in loctions shown in the plans .

B. Do not remove or damage vegetation beyond the limits indicated on drawings.

C. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.

D. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.

E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 2200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rough grading and preparing the site for pavements.

B. Finish grading.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: See Section 31 2323.

B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
   1. Contractor shall utilize the Minnesota Gopher State One Call, 1-800-252-1166 for locating and marking of all utility within the work area prior to any excavation on the project site.

D. Notify utility company to remove and relocate utilities.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

H. Protect plants, lawns, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

A. Remove all unsuitable soils (topsoil, soils with trace organics, wet or otherwise disturbed soils) from the building areas.

B. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

C. Do not remove topsoil when wet.

D. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

E. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

F. When excavating through roots, perform work by hand and cut roots with sharp axe.

G. See Section 31 2323 for filling procedures.

H. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.

I. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

J. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL AND STOCKPILING

A. Stockpile subsoil to be re-used on site; remove remainder from site.

B. See Section 31 2316 for subsoil and rock stockpiling and disposal.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted as approved by Testing Agency.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products from construction activities.

C. Where topsoil is to be placed, scarify surface to depth of 6 inches.

D. Place topsoil in areas indicated.

E. Place topsoil to thickness as indicated.

F. Place topsoil during dry weather.

G. Remove roots, weeds, rocks, and foreign material while spreading.

H. Near plants spread topsoil manually to prevent damage.

I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

J. Lightly compact placed topsoil.

K. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

C. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

D. Top Surface of Finish Grade: Plus or minus 1/2 inch.

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Engineer as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

A. See Section 31 2323 for compaction density testing.

3.09 CLEANING

A. Remove stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2316
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for slabs-on-grade and paving.

B. Protection of existing built elements and adjacent areas (Shoring and Bracing).

PART 2 PRODUCTS - (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 31 2200 for additional requirements.

C. Locate, identify, and protect utilities that remain and protect from damage.

D. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Engineer.

3.03 EXCAVATING

A. Excavate to elevations and dimensions required by the drawings and as necessary to complete the work.

B. Excavate to accommodate new structures and construction operations.

C. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

D. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Cut utility trenches wide enough to allow inspection of installed utilities.

G. Hand trim excavations. Remove loose matter.

H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

I. Provide temporary means and methods, as required, to remove all water from excavations. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

J. Remove excavated material that is unsuitable for re-use from site.

K. Stockpile excavated material to be re-used in area designated on site. Protect stockpile from erosion.

L. Remove excess excavated material from site.

3.04 REPAIR

A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

3.05 COMMON EXCAVATION

A. Material to be excavated that can be removed by hand shoveling, power shovel, bulldozer or other normal heavy equipment but not requiring the use of drills, and blasting shall be defined as common excavation. The contractor is responsible for all common excavation necessary to complete the work.

3.06 UNSUITABLE SOIL REMOVAL

A. In all areas of fill or foundations remove all unsuitable soil (topsoil, soil with trace organics, soft or otherwise disturbed soils) prior to the placement of subsequent fill soils or foundations.
   1. The contractor is responsible for all unsuitable soil removal necessary to complete the work.
   2. After all unsuitable soils are removed the Owner's Geotechnical Engineer shall observe the excavated surface to determine if all unsuitable soils have been removed and it is ready for subsequent fill soils or foundations. The Contractor shall coordinate with the Owner's Geotechnical Engineer for these observations.
   3. Unauthorized over excavations by the Contractor shall be backfilled in accordance with Section 31 2323, by the Contractor at no additional cost to the Owner.

3.07 PROTECTION OF EXISTING BUILT ELEMENTS AND ADJACENT AREAS (SHORING AND BRACING)

A. The Contractor is responsible for the protection of existing buildings, utilities, streets, etc. during construction and for design and installation of all necessary temporary bracing, shoring an underpinning to ensure such protection.

B. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions, stability of material excavated or need to protect undermining of existing walks, streets and/ or utilities. Maintain sides and slopes of excavations in safe condition.

C. Sedimentation and Erosion Control: Provide necessary erosion control measures as required, detailed in the plans and specified herein. Fabric or heavy plastic shall also be installed including weighting as necessary on the downside slope of all open excavations, stockpiled soil and as required at pocketed footings to prevent soil from accumulating in them. Fabric or plastic embankment protection shall not be left in place at the completion of the excavation project.

D. Dewatering: Contractor is responsible for dewatering of site including all bailing and pumping necessary to keep all depressions, pits, trenches and other parts of the site and excavated areas free of water during the entire progress of the work. All dewatering operations shall pass through a sediment containment device prior to discharge from the site.

3.08 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Engineer before placement of foundations.

C. Provide proof-rolling of excavated subgrade in pavement areas with a loaded tandem axle dump truck prior to placement of fill and/or pavement sub-base materials. Subgrade shall be approved by the geotechnical engineer prior to placement of fill and/or sub-base materials.

3.09 CLEANING

A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.

B. Remove excavated material that is unsuitable for re-use from site.

3.10 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

F. Keep excavations free of water. Provide dewatering by approved means. Water pumped or otherwise discharged from the site during construction shall be directed towards sediment containing devices prior to discharge.

END OF SECTION

SECTION 31 2323

FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for paving.

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

1.03 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Non-organic select compactible salvaged Subsoil excavated on-site and/or imported MnDOT 2105.2B Common Borrow. When on-site soils are exhausted the Contractor shall provide imported MnDOT Common Borrow as necessary to complete the work. General Fill excavated from on-site shall meet the following requirements.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   3. General Fill salvaged from on-site shall be selected, separated and protected to manage the soils moisture content. The Contractor shall dry or moisture condition the soil as necessary in order to achieve the required compaction densities. If drying the soils is not feasible due to weather or the season, the Contractor shall provide Common Borrow to balance the site at no additional cost to the Owner.
   4. If salvaged subsoil from on-site is not compactible due to moisture content, or for other reasons, the Contractor shall remove the uncompactable soils and replace with MnDOT 2105.2B Common Borrow.

B. Granular Fill (NFS): conforming to MnDOT 3149.2B Select Granular Borrow, modified so that of the portion passing the 1 inch sieve, not more than 7 percent by weight shall pass the No. 200

sieve, and no salvaged bituminous or concrete materials are allowed. Maximum particle size shall not exceed 2 inches and no less than 71 percent shall pass the 3/4 inch sieve.

C. Sand: conforming to MnDOT 3149.2G Aggregate Bedding except that the ratio of the portion passing the #200 sieve divided by the portion passing the 1 in sieve shall not exceed 5 percent by mass.

D. Topsoil: Friable loam; imported borrow.
   1. Select.
   2. Graded.
   3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
   4. Acidity range (pH) of 5.5 to 7.5.
   5. Containing a minimum of 4 percent and a maximum of 25 percent organic matter.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work. If source must change then retest at no cost to the Owner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 31 2200 for additional requirements.

D. Verify subgrade has been approved by the geotechnical engineer. See Section 31 2316.

E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Granular Fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Bench fill into the native soils on all sloped surface 5 horizontal to 1 vertical or steeper. Place fills in uniform thickness horizontal lifts.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Slope grade away from building minimum 2.5 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

G. Correct areas that are over-excavated.
   1. Under, paving slabs-on-grade and similar construction: Use Granular Fill, flush to required elevation, compacted to 95 percent of maximum dry density.
   2. Other areas: Use General Fill, flush to required elevation, compacted to minimum 90 percent of maximum dry density.

H. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
   2. At all other locations: 90 percent of maximum dry density.

I. Reshape and re-compact fills subjected to vehicular traffic.

J. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Engineer. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Use General Fill unless otherwise specified or indicated.

B. Under Exterior Paving, or similar construction:
   1. Use Granular Fill.
   2. Place material in loose layers of uniform thickness not exceeding 8-inches and compact each layer.
   3. Fill up to subgrade elevation. Refer to the finish surface sections on the drawings for subsequent fill layers.
   4. Fill layers within the upper 3ft of exterior pavement shall be compacted to 95 percent of maximum dry density or as specified for the specific fill type. Fill layers at greater than 3ft below exterior pavement shall be compacted to 90 percent of maximum dry density.

C. Over Buried Utility Piping and Conduits in Trenches: See Section 31 2316.13

D. At Vegetated Areas:
   1. Use General Fill.
   2. Fill up to 4 inches below finish grade elevations.
   3. Compact to 90 percent of maximum dry density.
   4. See Section 31 2200 for topsoil placement.

3.05 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.06 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform gradation testing on fill materials in accordance with ASTM C136/C136M.
   1. If tests indicate material does not meet specified requirements, remove, replace and retest.
   2. Frequency of Tests: Provide the minimum number of tests as follows, one test minimum.
      a. Granular Borrow: One test at/of fill source and one test for every 1000 cu. yds. of fill placed on site. One test minimum.
      b. Granular Fill, Sand: One test at/of fill source and one test for every 500 cu. yds. of fill placed on site. One test minimum.
      c. Import Topsoil: Gradation test and soil composition to include pH and percentage of organics. One test minimum.

C. Perform compaction density testing on compacted fill in accordance with ASTM D6938.
   1. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 1557 ("modified Proctor").
   2. If tests indicate work does not meet specified requirements, remove work, replace and retest.
   3. Frequency of Tests: Provide the minimum number of tests as follows, one test minimum.

a. Slabs-On-Grade: One test for every 1000 sq. ft. per 1ft of depth of material placed or fraction thereof.
b. Exterior Paving and Similar Construction: One test for every 2500 sq. ft. per 1ft of depth of material placed or fraction thereof.
c. Vegetated Areas: One test for every 10,000 sq. ft. per 1ft of depth of material placed or fraction thereof.

D. Proof roll compacted fill at surfaces that will be under slabs-on-grade and paving.

3.07 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 31 3219

GEOTEXTILE SOIL STABILIZATION AND LAYER SEPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This work shall consist of placing geotextile below the fill material at the location(s) shown in the Plan.

B. The purpose of the geotextile layer is to provide separation between the fill and underlying softer soils, to prevent mixing, to provide stability during compaction, to provide some reinforcement and to minimize differential movement.

PART 2 PRODUCTS

2.01 MATERIALS

A. Geotextile Fabric: Non-woven separator/strengthening material meeting the requirements of MnDOT 3733 Type V.

PART 3 EXECUTION

3.01 PREPARATION

A. The prepared surface shall be relatively smooth and free of stones, sticks, or other debris or irregularities that would tend to puncture or tear the geotextile.

B. Unless otherwise directed or approved by the Engineer, the geotextile shall be placed with the highest strength direction (usually the "machine" or roll direction) oriented in the direction of the greatest expected field stress (this will usually be at right angles to the centerline of the construction).

3.02 INSTALLATION

A. If multiple pieces of geotextile are required, adjacent strips shall be field or factory sewn. All seams shall be sewn using a "double spool" machine capable of sewing a Federal Type 401 locking stitch. Seam type (flat, "J", or butterfly), thread strength 25 lbs. minimum, number of rows of stitching (1 or 2) and stitches per inch (typically 5-7) shall be consistent with achieving the required seam strength and as recommended by the geotextile manufacturer.

B. The geotextile shall be adequately secured so that it is not displaced during subsequent construction. No traffic or construction equipment will be permitted to operate directly on the geotextile. Any damaged geotextile shall be repaired to the satisfaction of the Engineer by patching and sewing, or when appropriate, a 36 inch overlap on all sides without sewing.

C. Fill shall be placed onto the fabric in uniform lifts as required by the applicable specification and approved by the Engineer, but in no case shall lifts in excess of 18 inches be used, unless required to bring the fill above water level or provide stability. Fill material shall be as shown in the Plan. For placement underwater and for 2 feet above water level, granular materials shall be used unless otherwise provided in the Plans or approved by the Engineer.

END OF SECTION

SECTION 32 1123
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012, with Editorial Revision (2015).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).

D. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.

E. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

D. Compaction Density Test Reports.

1.04 DELIVERY, STORAGE, AND HANDLING

A. When aggregate materials need to be stored on site, locate where directed by Owner.

B. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Base: conforming to MNDOT 3138 Aggregate Base, Class 5.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for general requirements for testing and analysis of aggregate materials.

B. If tests indicate materials do not meet specified requirements, change material and retest.

C. Provide materials of each type from same source throughout the Work. If source must change then retest at no cost to the Owner.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, is dry, and gradients and elevations are correct.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Under Bituminous Concrete Paving:
   1. Place Aggregate Base to a total compacted thickness indicated on the plans.
   2. Compact to 100 percent of maximum dry density.

B. Under Portland Cement Concrete Paving:
   1. Place Aggregate Base to a total compacted thickness indicated on the plans.
   2. Compact to 100 percent of maximum dry density.

C. Place aggregate in maximum 8 inch lifts and roller compact to specified density.

D. Level and contour surfaces to elevations and gradients indicated.

E. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements for general requirements for field inspection and testing.

B. Perform gradation testing on fill materials in accordance with ASTM C136/C136M.
   1. If tests indicate material does not meet specified requirements, remove, replace and retest.
   2. Frequency of Tests: Provide the minimum number of tests as follows, one test minimum.
      a. Aggregate Base: One test at/of fill source and one test for every 1000 cu. yds. of fill placed on site.

C. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.
   1. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor").
   2. If tests indicate work does not meet specified requirements, remove work, replace and retest.
   3. Frequency of Tests: Provide the minimum number of tests as follows, one test minimum.
      a. Exterior Paving and Similar Construction: One test for every 2500 sq. ft. per 1ft of depth of material placed or fraction thereof.

D. Proof roll compacted aggregate at surfaces that will be under paving. Contractor shall obtain the approval of the geotechnical engineer regarding the suitability of the compacted aggregate surfacing layer prior to the placement of bituminous or concrete surfacing.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 1216
ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Double course bituminous concrete paving.

1.02 SUBMITTALS

A. Provide bituminous mix design data.

1.03 QUALITY ASSURANCE

A. Asphalt Paving shall be in accordance with MnDOT 2360 except as modified below.

1.04 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 32 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tack Coat: Bituminous Tack Coat according to MnDOT 2357.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Base Course: conform to MnDOT Section 2360 mixture type Non-Wearing Course SPNWB330C.

B. Wearing Course: conform to MnDOT Section 2360 mixture type Wearing Course SPWEA340C.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with MnDOT 2360, all testing shall be performed by the Contractor.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted Aggregate Base is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions and MnDOT 2357.

B. Apply tack coat to contact surfaces of curbs, gutters and existing pavement match points.

C. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.03 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Install Work in accordance with MnDOT 2360.

B. Place asphalt binder course within 24 hours of applying primer or tack coat.

C. Place base course to thickness indicated on drawings.

D. Place wear course to thickness indicated on drawings.

E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

F. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. Provide field inspection and testing. Take samples and perform tests in accordance with MnDOT 2360. All testing shall be performed by the Contractor.

3.06 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 1 day or until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete curb and gutter, concrete pavement, concrete sidewalks and accessories.

1.02 REFERENCE STANDARDS

A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

B. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.

C. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2017b.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.

F. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on joint filler and curing compound.

1.04 QUALITY ASSURANCE

A. Concrete Pavement shall conform to MnDOT 2301.

B. Concrete Sidewalks shall conform to MnDOT 2521.

C. Concrete Curb & Gutter shall conform to MnDOT 2531, Design S 5-18, except where matching existing curbs as shown in the plans.

D. Except as modified below

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 80 (80,000 psi) yield strength; deformed billet steel bars; unfinished.

B. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; deformed billet steel bars; unfinished finish.

2.02 CONCRETE MATERIALS

A. Concrete Materials: conforming to MnDOT 2461.

2.03 ACCESSORIES

A. Curing Compound: White Membrane Curing Compound, conforming to ASTM C309, Type 2.

B. Joint Filler: 3/4 inch thick, height equal to slab thickness, that will form 1 inch deep backer rod and sealant pocket.
   1. Material: Closed-cell, non-absorbent, compressible polymer foam in sheet form.
   2. Manufacturers:
      a. Nomaco, Inc: www.nomaco.com/#sle.

C. Backer Rod: 3/4 inch as recommended by Sealant manufacturer. ASTM C1330 Type B.

D. Sealant: Non-sag Silicone. ASTM C920 Grade NS Use T by DOW, Tremco, or approved equal.

E. Tactile Warning Surfaces: See Section 32 1726.

2.04 CONCRETE MIX DESIGN

A. Concrete Mix:
   1. Concrete Paving: conforming to MnDOT 2461, Mix No. 3A41.
   2. Concrete Sidewalks: conforming to MnDOT 2461, Mix No. 3F52.
   3. Concrete Curb & Gutter: conforming to MnDOT 2461, Mix No. 3F52 for manual placement and Mix No. 3F32 for slip-form placement.

2.05 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted Aggregate Base is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

3.03 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

3.04 REINFORCEMENT

A. Place reinforcement as indicated.

3.05 PLACING CONCRETE

A. Place concrete paving in accordance with MnDOT 2301.

B. Place concrete sidewalks in accordance with MnDOT 2521.C1.

C. Place concrete curb and gutter in accordance with MnDOT 2531.E, F & G.

D. Do not place concrete when base surface is wet.

3.06 JOINTS

A. Concrete paving joints and joint sealing shall conform to MnDOT 2301.

B. Joint concrete sidewalks in accordance with MnDOT 2521.C2.

C. Joint concrete curb and gutter in accordance with MnDOT 2531.C.

D. Align curb, gutter, and sidewalk joints.

E. Place 3/4 inch expansion joints to separate concrete paving from existing concrete, stoops, or building walls. After concrete curing install backer rod and sealant as recommended by manufacturer.

3.07 FINISHING

A. Finish concrete paving in accordance with MnDOT 2301 (metal-tine texturing is not required).

B. Finish concrete sidewalks in accordance with MnDOT 2521.C1.

C. Finish concrete curb and gutter in accordance with MnDOT 2531.E.

D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.08 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.

B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

C. Perform one slump and air test at the point of discharge for each and every concrete truck delivery to the site.

3.10 PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

SECTION 32 1723.13
PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, handicapped symbols, and curb markings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint; yellow.
   1. Parking Lots: White.
   2. Handicapped Symbols: Blue.

PART 3 EXECUTION

3.01 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

C. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

D. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

3.02 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

E. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Width Tolerance: Plus or minus 1/8 inch.

F. Parking Lots: Apply parking space lines, and other markings indicated on drawings.
   1. Mark the International Handicapped Symbol at indicated parking spaces.
   2. Hand application by pneumatic spray is acceptable.

3.03 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to Owner.

END OF SECTION

SECTION 32 1726
TACTILE WARNING SURFACING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tactile and detectable warning tiles/plates for pedestrian walking surfaces.

1.02 REFERENCE STANDARDS

A. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).

B. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; 2011.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.

B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.

B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cast Iron Detectable Warning Plates:
   1. Neenah Foundry, a division of Neenah Enterprises, Inc: www.nfco.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 TACTILE AND DETECTABLE WARNING DEVICES

A. Cast Iron Detectable Warning Plates:
   1. Material: Cast gray iron; ASTM A48/A48M, Class 30 A (minimum).
   2. Square Dimensions: 24 inches square.

PART 3 EXECUTION

3.01 EXAMINATION

A. When installation location is near site boundary or property line, verify required location using property survey.

B. Verify that work area is ready to receive work:
   1. If existing conditions are not as required to properly complete the work of this section, notify Engineer.
   2. Do not proceed with installation until deficiencies in existing conditions have been corrected.

C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.02 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's written instructions.

1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.

B. Field Adjustment:
1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
2. Orient so dome pattern is aligned with the direction of ramp.

C. Install units fully seated to substrate, square to straight edges and flat to required slope.

3.03 INSTALLATION - CAST IN PLACE, CAST IRON PLATES

A. Install by method described in manufacturer's written instructions.

B. Place units into wet concrete.

C. Press assembly into concrete to achieve final elevation.

D. Finish concrete adjacent to plate. Remove wet concrete spilled onto plate surface.

3.04 PROTECTION

A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.

B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION

SECTION 32 3113
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire fabric.

B. Manual gates with related hardware.

C. Accessories.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

B. ASTM A428/A428M - Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles; 2010 (Reapproved 2014).

C. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric; 2011 (Reapproved 2017).

D. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2014a.

E. CLFMI CLF-SFR0111 - Security Fencing Recommendations; 2014.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of documented experience.

B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain Link Fences and Gates:
   1. Master-Halco, Inc; : www.masterhalco.com/#sle.
   2. Merchants Metals; : www.merchantsmetals.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

A. Line Posts: 1.9 inch diameter.

B. Corner and Terminal Posts: 2.38 inch diameter.

C. Gate Posts: 3-1/2 inch diameter.

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.

E. Bottom Rail: 1.66 inch diameter, plain end, sleeve coupled.

F. Gate Frame: 1.66 inch diameter for welded fabrication.

G. Fabric: 2 inch diamond mesh interwoven wire, 6 gauge, 0.1920 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.

H. Tension Wire: 6 gauge, 0.1920 inch thick steel, single strand.

I. Tie Wire: Aluminum alloy steel wire.

2.03 MATERIALS

A. Wire Fabric: Other than vinyl coated:
   1. ASTM A491 aluminum coated steel chain link fabric.

2.04 MANUAL GATES AND RELATED HARDWARE

A. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp; keepers to hold gate in fully open position.

B. Hinges: Finished to match fence components.

C. Latches: Finished to match fence components.

2.05 ACCESSORIES

A. Caps: Aluminum alloy; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

2.06 FINISHES

A. Components (Other than Fabric): Aluminum coated at 0.40 ounces per square foot, when measured in accordance with ASTM A428/A428M. Where indicated in the plans.

B. Components and Fabric: Vinyl coated over coating of 1.8 ounces per square foot galvanizing. Where indicated in the plans.

C. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.

D. Accessories: Same finish as framing.

E. Color(s): Black.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.02 PREPARATION

A. Removal: Obstructions or debris.

3.03 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Place fabric on outside of posts and rails.

C. Set intermediate, terminal, and gate posts plumb. Drive-set line and terminal posts to depth indicated in the detail drawings. Install gate posts in concrete as indicated in the detail drawings.

D. Brace each gate and corner post to adjacent line post with horizontal center brace rail. Install brace rail one bay from end and gate posts.

E. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

F. Install center brace rail on corner gate leaves.

G. Do not stretch fabric until concrete foundation has cured 28 days.

H. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

I. Position bottom of fabric 2 inches above finished grade.

J. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

K. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

L. Install bottom tension wire stretched taut between terminal posts.

M. Do not attach the hinged side of gate to building wall; provide gate posts.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.

C. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.

D. Gates: Inspect for level, plumb, and alignment.

3.06 CLEANING

A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

B. Clean fence with mild household detergent and clean water rinse well.

C. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

END OF SECTION

SECTION 32 3119
DECORATIVE METAL FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Decorative aluminum fences.

1.02 REFERENCE STANDARDS

A. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

C. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets; 2016.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
   2. Foundation details, concrete design mix and reinforcing schedule for anti-ram barrier system.

D. Manufacturer's Installation Instructions: Indicate installation requirements and post foundation anchor bolt templates.

E. Manufacturer's Warranty.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 10 years documented experience.

B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.06 WARRANTY

A. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Decorative Metal Fences and Gates:
   1. Ameristar Perimeter Security, USA: www.ameristarfence.com/#sle.
   2. Superior Aluminum Products, Inc: www.superioraluminum.com/#sle.
   3. Ultra Aluminum Manufacturing Inc: www.ultrafence.com/#sle.

2.02 FENCES

A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:

B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
   1. Total Coating Thickness: 2 mils, minimum.
   2. Color: As selected by Architect from manufacturer's standard range.

C. Aluminum: ASTM B221.
   1. Tubular Pickets, Rails and Posts: 6005-T5 alloy.
   2. Extrusions for Posts and Rails (Outer Channel): 6005-T5 alloy.
   3. Extrusions for Pickets and Rail (Inner Slide Channels): 6063-T5 alloy.

D. Fasteners: ASTM A276/A276M, Type 302 stainless steel; finished to match fence components.

2.03 ALUMINUM FENCE

A. Decorative Aluminum Fence System: Provide fence meeting the Test Load and Coating Performance requirements of ASTM F2408 for Industrial class.
   1. Fence Panels: 6 feet high by 8 feet long.
      a. Panel Style: Four rail.
      b. Panel Strength: Capable of supporting 270 pounds minimum load applied at midspan without deflection.
      c. Attach panels to posts with manufacturer's standard panel brackets and recommended fasteners.
      d. Posts: Aluminum extrusions; 4 inches square.
      e. Rails: Extruded aluminum channels.
         1) Double-walled aluminum U-channel; outside cross-section dimensions of 1-3/4 inch square; interior guide channel forms lower limit of raceway for retaining rod.
         2) Enclosed Retaining Rod: 1/8 inch diameter galvanized steel with variable pitch connection system for high angle racking and elimination of external fasteners.
         3) Picket-to-Rail Intersection Seals: PVC grommets.
         4) Picket Spacing, Standard: 3-7/8 inch on center.
      f. Pickets: Extruded aluminum tubes.
         1) Style: Pickets with finial extend above top rail.
      g. Fasteners: Manufacturer's standard stainless steel bolts, screws, and washers; factory finish fasteners to match fence.
      h. Products:
         1) Ameristar Perimeter Security, USA; Echelon II: www.ameristarfence.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Set fence posts in accordance with the manufacturer recommended spacing.

C. When cutting rails immediately seal the exposed surfaces by:
   1. Removing metal shavings from cut area.
   2. Apply zinc-rich primer to thoroughly cover cut edge and drilled hole; allow to dry.
   3. Apply two coats of custom finish spray paint matching fence color.
   4. Failure to seal exposed surfaces in accordance with manufacturer's instructions will negate manufacturer's warranty.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From Indicated Position: 1 inch.

C. Minimum Distance from Property Line: 6 inches.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.

C. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.

3.05 CLEANING

A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

B. Clean fence with mild household detergent and clean water rinse well.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 32 9223
SODDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Placing topsoil.

B. Fertilizing.

C. Sod installation.

D. Maintenance.

1.02 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

1.03 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Minnesota.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated below; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
   1. Perennial Ryegrass Grass Type: 10 to 20 percent.
   2. Kentucky Blue Grass Type: 80 to 90 percent.
   3. Cut sod in area not exceeding 1 sq yd.
   4. Machine cut sod and load on pallets in accordance with TPI (SPEC) Guidelines.

B. Topsoil: Type as specified in Section 31 2323.

C. Fertilizer: 10 -10 -10; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions:

D. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.02 ACCESSORIES

A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION

A. Place topsoil in accordance with Section 31 2200.

3.03 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.04 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration.

C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Where new sod adjoins existing grass areas, align top surfaces.

E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.

F. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

G. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.05 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water.

B. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

D. Neatly trim edges and hand clip where necessary.

E. Immediately remove clippings after mowing and trimming.

F. Water to prevent grass and soil from drying out.

G. Roll surface to remove irregularities.

H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

I. Immediately replace sod to areas that show deterioration or bare spots.

J. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

SECTION 32 9300
PLANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. New trees and plants.

B. Mulch and Fertilizer.

C. Tree Pruning.

1.02 DEFINITIONS

A. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.03 REFERENCE STANDARDS

A. ANSI/AHIA Z60.1 - American National Standard for Nursery Stock; 2014.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Submit list of plant life sources.

C. Submit product and installation data for edging.

1.05 QUALITY ASSURANCE

A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.

B. Installer Qualifications: Company specializing in installing and planting the plants with three years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

B. Protect and maintain plant life until planted.

C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.07 FIELD CONDITIONS

A. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

B. Do not install plant life when wind velocity exceeds 30 mph.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Procedures and Submittals, for additional warranty requirements.

B. Provide one year warranty.

C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.

D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

PART 2 PRODUCTS

2.01 PLANTS

A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.02 SOIL MATERIALS

A. Topsoil: Type as specified in Section 31 2323.

B. Planting soil: Mixture at the following proportions: Topsoil 1/2, peat moss at 1/4, and sand at 1/4. Submit sample for approval at site prior to installation.

2.03 SOIL AMENDMENT MATERIALS

A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions:
   1. Nitrogen: 10 percent.
   2. Phosphoric Acid: 10 percent.
   3. Soluble Potash: 10 percent.

B. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.

2.04 MULCH MATERIALS

A. Mulching Material: cedar species wood ground bark, free of growth or germination inhibiting ingredients.

2.05 ACCESSORIES

A. Weed Control Membrane: 20 mil thick, water permeable polyolefin fabric.

B. Edging: Aluminum edging by Permaloc. Cleanline 3/16" x 5.5" ph: 1 616 399 9600

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared subsoil are ready to receive work.

3.02 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Mix thoroughly into upper 2 inches of topsoil.

C. Lightly water to aid the dissipation of fertilizer.

3.03 PLANTING

A. Place plants for best appearance for review and final orientation by Engineer.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth as indicated on drawings under each plant. Remove burlap, ropes, and wires, from the root ball.

E. Saturate soil with water when the pit or bed is half full of planting soil and again when full.

3.04 INSTALLATION OF ACCESSORIES

A. Install edging in locations shown in the plans according to manufacturer's instructions. Install according to plan with smooth arcs, transitions, and straight lines.

3.05 TREE PRUNING

A. Prune newly planted trees as required to remove dead, broken, and split branches.

3.06 FIELD QUALITY CONTROL

A. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.07 MAINTENANCE

A. Maintain plant life immediately after placement and until plants are well established and exhibit a vigorous growing condition. Continue maintenance until termination of warranty period.

B. Irrigate sufficiently to saturate root system and prevent soil from drying out.

C. Cultivate and weed plant beds and tree pits.

D. Neatly trim plants where necessary.

E. Immediately remove clippings after trimming.

F. Replace mulch when deteriorated.

G. Maintain wrappings, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

END OF SECTION