



## **PROJECT MANUAL**

**CTH N STORM WATER MANAGEMENT FACILITY  
AND YARD WASTE TRANSFER SITE  
CONSTRUCTION, CONTRACT B-21  
TOWN OF BUCHANAN  
OUTAGAMIE COUNTY, WI**

**Quest eBidDoc #8033354**

September 2021

CEDAR CORPORATION  
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Engineer's Project Number: 04916-0095

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# CTH N Storm Water Management Facility and Yard Waste Transfer Site Construction, Contract B-21

Engineer's Project Number: 04916-0095

September 2021

Prepared for:

Town of Buchanan  
Outagamie County, WI

Prepared by:



#### REUSE OF DOCUMENTS

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SECTION 00 01 07  
SEALS AND SIGNATURES

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I hereby certify that the portion of this submission described below was prepared by me, or under my direct supervision and responsible charge. I am a duly Licensed Professional Engineer under the laws of the State of Wisconsin.



Thad M. Majkowski, P.E.

Signature

A handwritten signature in blue ink, appearing to read "Thad Majkowski", written over a horizontal line.

9/23/21

Date

Discipline: Project Manager

WI License No. E-25354

License expires: July 31, 2022

Division(s) covered by this seal: All

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I hereby certify that the portion of this engineering document described below was prepared by me, or under my direct supervision and responsible charge. I am a duly Licensed Professional Engineer under the laws of the State of Wisconsin.



Justin J. Keen, P.E.

Signature

A handwritten signature in blue ink, appearing to read "Justin J. Keen", written over a horizontal line.

9/23/21

Date

Discipline: Civil, Project Engineer

WI License No. E-40462

License expires: July 31, 2022

Division(s) covered by this seal: All

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**END OF SECTION**



**SECTION 00 11 13**  
**ADVERTISEMENT FOR BIDS**

Sealed bids for **CTH N Storm Water Management Facility and Yard Waste Transfer Site Construction, Contract B-21**, will be received by the Town of Buchanan at the Town Hall, N178 County Road N, Appleton, WI 54915, by 11:00 AM (local time) on October 7, 2021; and then at said office publicly opened and read aloud.

The work, in general, will include the approximate quantities and items listed below:

- 8,500 CY Excavation,
- 1,500 LF of 24"- 36" Storm Sewer,
- 800 CY Crushed Aggregate Base Course,
- 2,000 SY Hot Mix Asphalt Paving,
- 3,000 SY Pond Landscape Restoration,
- Erosion Control Practices.

The proposals shall be submitted on the forms furnished with the specifications. Each proposal shall be accompanied by a certified check payable to the owner equal to five percent (5%) of the proposal or a bid bond of a bonding company duly authorized to do business in the State of Wisconsin in an amount equal to five percent (5%) of the proposal. This proposal guarantee shall be subject to forfeiture as provided by law.

Complete digital project bidding documents are available at [www.cedarcorp.com](http://www.cedarcorp.com). You may download the digital plan documents for \$30.00 (**Quest eBidDoc #8033354**). Please contact QuestCDN.com at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance in free membership registration, downloading, and working with this digital project information.

An *optional* paper set of project documents is also available from Blue Print Service Company for a non-refundable cost-plus applicable sales tax and shipping. (Full-size drawings are available upon request at an additional cost. Only printed plans obtained from Blue Print Service Company shall be considered scalable plans.) Contact Blue Print Service Company for pricing and instructions: 920-733-4539 or [bps@blueprintservic.com](mailto:bps@blueprintservic.com).

Prequalification of Bidders will not be required.

Proposals shall not be withdrawn for a period of 60 days after the date of opening. The Town of Buchanan reserves the right to reject any or all of the proposals and to waive any informalities therein.

Dates of Publication: September 22, 2021 and September 29, 2021

By Authority of: Maggie Mahoney, Town Administrator

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**SECTION 00 21 13**  
**INSTRUCTIONS TO BIDDERS**

**ARTICLE 1 – DEFINED TERMS**

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office* – The office from which the Bidding Documents are to be issued.

**ARTICLE 2 – COPIES OF BIDDING DOCUMENTS**

- 2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

**ARTICLE 3 – QUALIFICATIONS OF BIDDERS**

- 3.01 To demonstrate Bidder’s qualifications to perform the Work, after submitting its Bid and within 5 days of Owner’s request, Bidder shall submit (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:
- A. Evidence of Bidder’s authority to do business in the state where the Project is located.
- B. Bidder’s state or other contractor license number, if applicable.
- C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, “Subcontractors, Suppliers, and Others.”
- 3.02 A Bidder’s failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder’s qualifications.
- 3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder’s representations and certifications.

**ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS;  
EXAMINATION OF SITE; OWNER’S SAFETY PROGRAM; OTHER WORK AT THE  
SITE**

4.01 *Site and Other Areas*

- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

- A. Subsurface and Physical Conditions; Hazardous Environmental Conditions
1. The Supplementary Conditions identify:
    - a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
    - b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
    - c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
    - d. Technical Data contained in such reports and drawings.
  2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
  3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions

concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

#### 4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.
- B. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.
- C. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- D. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

#### 4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

#### 4.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

### **ARTICLE 5 – BIDDER'S REPRESENTATIONS**

5.01 It is the responsibility of each Bidder before submitting a Bid to:

- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

- B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;
- E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;
- F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

## **ARTICLE 6 – PRE-BID CONFERENCE**

6.01 A pre-Bid conference will not be held.

## **ARTICLE 7 – INTERPRETATIONS AND ADDENDA**

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven (7) days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. However, if there is a desire to discuss any aspect of the bidding documents, then contact Justin Keen, P.E. at the office of the Engineer, telephone 920-785-7303.
- 7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

## **ARTICLE 8 – BID SECURITY**

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

## **ARTICLE 9 – CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

## **ARTICLE 10 – LIQUIDATED DAMAGES**

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

## **ARTICLE 11 – SUBSTITUTE AND “OR-EQUAL” ITEMS**

- 11.01 The Contract for the Work, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those “or-equal” or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an “or-equal” or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids in the case of a proposed substitute and 5 days prior in the case of a proposed “or-equal”. Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer’s decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.
- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

## **ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 12.01 All Bidders shall submit to Owner a list of the Subcontractors. Utilize form provided in bid proposal documents.
- If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute without an increase in bid price.
- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.
- 12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.
- 12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.06.A.



## **ARTICLE 13 – PREPARATION OF BID**

- 13.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
  - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.
- 13.03 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- 13.04 A Bid by an individual shall show the Bidder’s name and official address.
- 13.05 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.06 All names shall be printed in ink below the signatures.
- 13.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.09 The Bid shall contain evidence of Bidder’s authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder’s state contractor license number, if any, shall also be shown on the Bid Form.

## **ARTICLE 14 – BASIS OF BID**

- 14.01 *Unit Price*
- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
  - B. The “Bid Price” (sometimes referred to as the extended price) for each unit price Bid item will be the product of the “Estimated Quantity” (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding “Bid Unit Price” offered by the Bidder. The total of all unit price Bid items will be the sum of these “Bid Prices”; such total will be used by Owner for Bid comparison

purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

#### 14.02 Allowances

- A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

### **ARTICLE 15 – SUBMITTAL OF BID**

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.
- 15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." No oral, facsimile, e-mail, or telephone bids will be accepted.
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

### **ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID**

- 16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

## **ARTICLE 17 – OPENING OF BIDS**

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

## **ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

## **ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.
- 19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.
- 19.03 Evaluation of Bids
- A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
  - B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
  - C. Owner shall have the right to accept alternatives in any order or combination or to not accept any, unless specifically otherwise provided.
- 19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

## **ARTICLE 20 – BONDS AND INSURANCE**

20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

## **ARTICLE 21 – SIGNING OF AGREEMENT**

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

## **ARTICLE 22 – WAGE RATE REQUIREMENTS**

22.01 The contractor shall comply with all applicable federal, state, and local rules and regulations regarding the posting, certification, and filing of wage rates paid to employees.

**END OF SECTION**

**SECTION 00 41 00  
BID FORM**

Bidder's Name: \_\_\_\_\_

Project Title: CTH N Storm Water Management Facility and  
Yard Waste Transfer Site Construction,  
Contract B-21

**ARTICLE 1 – BID RECIPIENT**

1.01 This Bid is submitted to: TOWN OF BUCHANAN  
ATTN: TOWN ADMINISTRATOR  
N178 COUNTY ROAD N  
APPLETON, WI 54915

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

**ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS**

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

**ARTICLE 3 – BIDDER'S REPRESENTATIONS**

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

## **ARTICLE 4 – BIDDER’S CERTIFICATION**

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
  - 1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
  - 2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  - 3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
  - 4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

## **ARTICLE 5 – BASIS OF BID**

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

**Unit Price Bid Schedule**

**CTH N Storm Water Management Facility and Yard Waste Transfer Site Construction,  
Contract B-21**

<b>ITEM NO.</b>	<b>BID ITEM</b>	<b>UNIT</b>	<b>QTY</b>	<b>UNIT PRICE</b>	<b>ITEM TOTAL</b>
<b>BASE BID:</b>					
<b>SCHEDULE A - CTH N STORMWATER MANAGEMENT FACILITY AND OUTFALL PIPE:</b>					
A-1	MOBILIZATION	1	L.S.	\$	\$
A-2	CLEARING & GRUBBING	1	L.S.	\$	\$
A-3	COMMON EXCAVATION - STORM WATER POND (EST. 8,500 C.Y.)	1	L.S.	\$	\$
A-4	4" D.I. CLASS 52 PIPE	50	L.F.	\$	\$
A-5	18" RCP STORM SEWER	12	L.F.	\$	\$
A-6	24" RCP STORM SEWER	725	L.F.	\$	\$
A-7	24" RCP APRON ENDWALL	2	EA.	\$	\$
A-8	OUTLET STRUCTURE STORM MANHOLE, STANDARD, 4' DIA.	6.7	V.F.	\$	\$
A-9	STORM MANHOLE, TYPE 'S', 5' DIA.	1	EA.	\$	\$
A-10	STORM MANHOLE, STANDARD, 5' DIA.	15	V.F.	\$	\$
A-11	STORM MANHOLE, STANDARD, 4' DIA.	8	V.F.	\$	\$
A-12	PIPE FOUNDATION, AS ORDERED	25	C.Y.	\$	\$
A-13	RIPRAP	20	S.Y.	\$	\$
A-14	TURF REINFORCEMENT MAT - EMERGENCY OVERFLOW	30	S.Y.	\$	\$
A-15	CLAY DAM	2	EA.	\$	\$
A-16	RESTORATION - EROSION MAT, SEED, TOPSOIL, FERTILIZER - POND SLOPES/BERMS ABOVE PERMANENT WATER ELEVATION (EST. 3,500 SY)	1	L.S.	\$	\$
A-17	RESTORATION - SEED, TOPSOIL, FERTILIZER, MULCH- DISTURBED AREAS OUTSIDE BERMS (EST. 1,200 SY)	1	L.S.	\$	\$
A-18	INLET PROTECTION	4	EA.	\$	\$
A-19	TRAFFIC CONTROL	1	L.S.	\$	\$
A-20	ALLOWANCES --TESTING AND INSPECTING ALLOWANCE				\$ 2,000.00
	<b>SUBTOTAL - SCHEDULE A</b>				<b>\$</b>
<b>SCHEDULE B - YARD WASTE TRANSFER SITE:</b>					
B-1	MOBILIZATION	1	L.S.	\$	\$
B-2	CLEARING & GRUBBING	1	L.S.	\$	\$
B-3	REMOVAL OF MISCELLANEOUS LANDSCAPING/FLAG POLE/YARD LIGHTS/PATIO	1	L.S.	\$	\$
B-4	REMOVAL OF PRIVATE UTILITIES	1	L.S.	\$	\$
B-5	DEMOLITION OF HOUSES, BACKFILL EXCAVATIONS	1	L.S.	\$	\$
B-6	REMOVE CONCRETE	600	SY	\$	\$
B-7	REMOVE ASPHALT	400	SY	\$	\$
B-8	SILT FENCE	1,300	L.F.	\$	\$
B-9	STONE TRACKING PAD	1	EA.	\$	\$
B-10	SELECT TRENCH GRANULAR BACKFILL	50	C.Y.	\$	\$
B-11	2" CONDUIT, SCHEDULE 80	360	L.F.	\$	\$
B-12	6" PVC WATER SERVICE	225	L.F.	\$	\$
B-13	CONNECT TO EXISTING WATER MAIN	1	EA.	\$	\$
B-14	6" VALVE	1	EA.	\$	\$
B-15	HYDRANT	1	EA.	\$	\$
B-16	4" SANITARY LATERAL, SCHEDULE 40	235	L.F.	\$	\$
B-17	COMMON EXCAVATION (EST. 1,000 C.Y.)	1	L.S.	\$	\$
B-18	EXCAVATION BELOW SUBGRADE (EBS), AS ORDERED	25	C.Y.	\$	\$
B-19	GEOGRID, AS ORDERED	400	S.Y.	\$	\$
B-20	CRUSHED AGGREGATE BASE, 1-1/4" (GRADATION NO. 2)	500	C.Y.	\$	\$
B-21	CRUSHED AGGREGATE BASE, 3" (GRADATION NO. 1)	540	C.Y.	\$	\$



ITEM NO.	BID ITEM	UNIT	QTY	UNIT PRICE	ITEM TOTAL
B-22	2" HMA PAVEMENT 4 LT 58-28H, BINDER COURSE	2,050	S.Y.	\$	\$
B-23	2" HMA PAVEMENT 4 LT 58-28H, SURFACE COURSE	2,050	S.Y.	\$	\$
B-24	PAVEMENT MARKING ARROWS	11	EA.	\$	\$
B-25	CONCRETE DRIVEWAY, 8-INCH	430	S.F.	\$	\$
B-26	CONCRETE BLOCK (2' x 2' x 6') RETAINING WALL	2,010	S.F.	\$	\$
B-27	RESTORATION - SEED, MULCH, TOPSOIL, & FERTILIZER (EST. 2,500 S.Y.)	1	L.S.	\$	\$
B-28	PLASTIC PRIVACY FENCE (6' HEIGHT)	370	L.F.	\$	\$
B-29	CHAIN LINK FENCE (6' HEIGHT)	1,975	L.F.	\$	\$
B-30	ALLOWANCES --TESTING AND INSPECTING ALLOWANCE				\$ 1,000.00
B-31	ALLOWANCES -- ENTRANCE GATE ALLOWANCE				\$ 25,000.00
B-32	ALLOWANCES -- SECURITY SYSTEM ALLOWANCE				\$ 15,000.00
	<b>SUBTOTAL - SCHEDULE B</b>				<b>\$</b>
<b>SCHEDULE C - RUBY CT AND BARNEY CT STORM SEWER:</b>					
C-1	MOBILIZATION	1	L.S.	\$	\$
C-2	CLEARING AND GRUBBING	1	L.S.	\$	\$
C-3	ROCK FILLED FILTER BAGS (5 BAGS EACH LOCATION)	10	EA.	\$	\$
C-4	REMOVE DRIVEWAY	170	S.Y.	\$	\$
C-5	REMOVE EXISTING CULVERT PIPE	105	L.F.	\$	\$
C-6	FILL MATERIAL - DITCHES	1	L.S.	\$	\$
C-7	PIPE FOUNDATION, AS ORDERED	10	C.Y.	\$	\$
C-8	SELECT TRENCH GRANULAR BACKFILL	25	C.Y.	\$	\$
C-9	CRUSHED AGGREGATE BASE COURSE, ROADWAY/DRIVEWAY	50	C.Y.	\$	\$
C-10	HMA BINDER, 1-3/4" (4LT 58-28S), PATCHING	35	S.Y.	\$	\$
C-11	HMA SURFACE, 1-3/4" (4LT 58-28S), PATCHING	35	S.Y.	\$	\$
C-12	4" STORM SEWER LATERAL	120	L.F.	\$	\$
C-13	6" STORM SEWER	20	L.F.	\$	\$
C-14	8" STORM SEWER	5	L.F.	\$	\$
C-15	INSTALL 18" SALVAGED CMP	10	L.F.	\$	\$
C-16	18" PVC STORM SEWER	44	L.F.	\$	\$
C-17	24" RCP STORM SEWER	495	L.F.	\$	\$
C-18	30" RCP STORM SEWER	330	L.F.	\$	\$
C-19	STORM MANHOLE, TYPE S, 4' DIA.	1	EA.	\$	\$
C-20	STORM MANHOLE, TYPE S, 5' DIA.	2	EA.	\$	\$
C-21	STORM MANHOLE, TYPE S, 6' DIA.	2	EA.	\$	\$
C-22	STORM MANHOLE, STANDARD, 6' DIA.	7.5	V.F.	\$	\$
C-23	YARD DRAIN, 8" PVC	1	EA.	\$	\$
C-24	CONNECT TO EXISTING SUMP DISCHARGE	6	EA.	\$	\$
C-25	TRACER WIRE CONNECTION BOX	6	EA.	\$	\$
C-26	18" CMP ENDWALL	1	EA.	\$	\$
C-27	30" APRON ENDWALL	1	EA.	\$	\$
C-28	RIPRAP	15	S.Y.	\$	\$
C-29	STONE TRACKING PAD	1	EA.	\$	\$
C-30	WATER SERVICE LOWERING, AS ORDERED	30	L.F.	\$	\$
C-31	INSULATION	10	S.Y.	\$	\$
C-32	RESTORATION - SEED, MULCH, TOPSOIL, FERTILIZER (EST. 2,000 S.Y.)	1	L.S.	\$	\$
C-33	TRAFFIC CONTROL	1	L.S.	\$	\$
C-34	ALLOWANCES --TESTING AND INSPECTING ALLOWANCE				\$ 2,000.00
	<b>SUBTOTAL - SCHEDULE C</b>				<b>\$</b>

ITEM NO.	BID ITEM	UNIT	QTY	UNIT PRICE	ITEM TOTAL
<b>SUMMARY - SUBTOTALS (BASE BID):</b>					
	SCHEDULE A - CTH N STORMWATER MANAGEMENT FACILITY AND OUTFALL PIPE				\$
	SCHEDULE B - YARD WASTE TRANSFER SITE				\$
	SCHEDULE C - RUBY CT AND BARNEY CT STORM SEWER				\$
	<b>PROJECT TOTAL (BASE BID):</b>				\$

(Above: Write out Project Total, including any Allowances.)

**ALTERNATE BID ITEMS (ADDITIVE):**

<u><b>ALTERNATE BID A-1: ALTERNATE STORM WATER POND OUTFALL PIPE MATERIAL:</b></u>					
ALT A-1	24" STORM SEWER, PVC		725 L.F.	\$	\$
<u><b>ALTERNATE BID B-1: YARD WASTE FENCE MATERIAL - ALL CHAIN LINK FENCE:</b></u>					
ALT B-1	CHAIN LINK FENCE (6' HEIGHT)		2,345 L.F.	\$	\$
<u><b>ALTERNATE BID B-2: YARD WASTE FENCE MATERIAL - ALL PLASTIC PRIVACY FENCE:</b></u>					
ALT B-2	PLASTIC PRIVACY FENCE (6' HEIGHT)		2,345 L.F.	\$	\$

The Owner reserves the right to select and add any of the Schedules or Alternates listed above. If the Owner selects one or more of the Schedules or Alternates, the award of the contract shall be based upon the total sum of the Schedules and Alternates selected.

**ARTICLE 6 – TIME OF COMPLETION**

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

**ARTICLE 7 – ATTACHMENTS TO THIS BID**

- 7.01 The following documents are submitted with and made a condition of this Bid:
  - A. Section 00 43 13 - Required Bid security in the form of a Bid Bond.
  - B. Section 00 43 36 - Proposed Subcontractors.
  - C. Evidence of authority to do business in the state of the Project; or ability to obtain such license within the time for acceptance of Bids.

**ARTICLE 8 – DEFINED TERMS**

- 8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

**ARTICLE 9 – BID SUBMITTAL**

SUBMITTED on \_\_\_\_\_, 20\_\_\_\_

State Contractor License No. \_\_\_\_\_  
(if applicable)

Federal I.D. # \_\_\_\_\_  
DUNS/CAGE # \_\_\_\_\_

If BIDDER is:

**An Individual**

\_\_\_\_\_  
(Signature - Individual's Name)

\_\_\_\_\_  
(Printed Name)

Doing Business As: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_ E-Mail: \_\_\_\_\_

**A Partnership**

\_\_\_\_\_  
(Firm Name)

By: \_\_\_\_\_  
(Signature) (General Partner) (Printed Name)

Business Address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_ E-Mail: \_\_\_\_\_

**A Corporation**

\_\_\_\_\_  
(Corporation Name)

\_\_\_\_\_  
(State of Incorporation)

By \_\_\_\_\_  
(Signature - Name of Person Authorized to Sign) (Printed Name)

\_\_\_\_\_  
(Corporate Seal) (President or Vice-President)

Attest \_\_\_\_\_  
(Signature - Corporate Secretary) (Printed Name)

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Registered Agent for Service or Process: \_\_\_\_\_  
\_\_\_\_\_

**A Joint Venture**

\_\_\_\_\_  
(Name of Joint Venture)

\_\_\_\_\_  
(SEAL)

\_\_\_\_\_  
(First Joint Venturer Name)

By \_\_\_\_\_  
(Signature - Name of First Joint Venture Partner – attach evidence of authority to sign)

\_\_\_\_\_  
(Printed Name) (Title)

\_\_\_\_\_  
(SEAL)

\_\_\_\_\_  
(Second Joint Venturer Name)

By \_\_\_\_\_  
(Signature - Name of First Joint Venture Partner – attach evidence of authority to sign)

\_\_\_\_\_  
(Printed Name) (Title)

(Each joint venture must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_ E-Mail: \_\_\_\_\_

AFFIDAVIT OF ORGANIZATION AND AUTHORITY

I, \_\_\_\_\_, being first duly sworn on oath certify that

\_\_\_\_\_  
(Name of Corporation, Partnership, or Person Submitting Bid)

Bidder on the attached Proposal is organized as indicated below; that I have examined and carefully prepared this Proposal from the Plans and Specifications and have checked the same in detail before submitting this Proposal; that all statements made herein are made on behalf of such Bidder and that I have full authority to make such statements and submit this proposal in (its) (their) behalf; and that the said statements are true and correct.

Bidder is (fill out applicable paragraph):

A corporation organized and existing under the laws of the State of \_\_\_\_\_, its President is \_\_\_\_\_, its Secretary is \_\_\_\_\_, and it does have a corporate seal. The \_\_\_\_\_ is authorized to sign construction

(Officer or Authorized Agent)

Contracts and Bids for the company by action of its Board of Directors taken \_\_\_\_\_,  
(Strike out this last sentence if NA)  
a certified copy of which is attached hereto.

A partnership consisting of \_\_\_\_\_ and \_\_\_\_\_ partners, doing business under the name of \_\_\_\_\_.

An individual operating under the trade name of \_\_\_\_\_.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Bidders Address

\_\_\_\_\_  
Title, if any

\_\_\_\_\_  
Telephone: \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
Notary Public, \_\_\_\_\_ County, \_\_\_\_\_

My Commission expires \_\_\_\_\_

(This Affidavit must be attached to and filed with the Bid Form.)

**SECTION 00 43 13  
BID BOND**

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

BID

Bid Due Date:

Description (*Project Name— Include Location*):

BOND

Bond Number:

Date:

Penal sum \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

**BIDDER**

**SURETY**

\_\_\_\_\_  
Bidder's Name and Corporate Seal (Seal) \_\_\_\_\_ Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

*Note: Addresses are to be used for giving any required notice.*

*Provide execution by any additional parties, such as joint venturers, if necessary.*

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2 All Bids are rejected by Owner, or
  - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.



**SECTION 00 43 36  
PROPOSED SUBCONTRACTORS FORM**

The following subcontractors will be utilized for portions of the project work. Changes shall not be made subsequent to the bid unless the change(s) is approved by the Owner.

Subcontractor	Classification of Work	Estimated Dollar Amount
	Traffic Control	\$
	Erosion Control	\$
	Excavation	\$
	Base Course	\$
	Asphalt Paving	\$
	Landscape Restoration	\$
	Storm Sewer	\$
	Pavement Marking	\$
	Fencing	\$
	Laterals – Water / Sewer	\$

*This page intentionally left blank.*

**SECTION 00 51 00  
NOTICE OF AWARD**

Date of Issuance: \_\_\_\_\_ Owner's Contract No.: \_\_\_\_\_  
Owner: \_\_\_\_\_ Engineer's Project No.: \_\_\_\_\_  
Engineer: \_\_\_\_\_ Contract Name: \_\_\_\_\_  
Project: \_\_\_\_\_  
Bidder: \_\_\_\_\_  
Bidder's Address: \_\_\_\_\_

**TO BIDDER:**

You are notified that Owner has accepted your Bid dated [ \_\_\_\_\_ ] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

\_\_\_\_\_  
*[describe Work, alternates, or sections of Work awarded]*

The Contract Price of the awarded Contract is: \$ \_\_\_\_\_ *[note if subject to unit prices, or cost-plus]*

\_\_\_\_\_ copies of the proposed contract documents (except drawings) accompany this Notice of Award.

\_\_\_\_\_ sets of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [ \_\_\_\_\_ ] counterparts of the Agreement and Notice of Award, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6, and Article 6 of the Supplementary Conditions.
3. Other conditions precedent (if any): \_\_\_\_\_ *[or, None].*

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

\_\_\_\_\_

Owner

By: \_\_\_\_\_  
Authorized Signature

\_\_\_\_\_

Title

ACCEPTANCE

\_\_\_\_\_

Contractor

By: \_\_\_\_\_  
Authorized Signature

\_\_\_\_\_

Title

**SECTION 00 52 13**  
**AGREEMENT BETWEEN OWNER AND CONTRACTOR**  
**FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)**

THIS AGREEMENT is by and between the Town of Buchanan (“Owner”) and  
\_\_\_\_\_ (“Contractor”).

Owner and Contractor hereby agree as follows:

**ARTICLE 1 – WORK**

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Select site demolition, clearing and grubbing, excavation and grading, storm sewer, base course, asphalt paving, and landscape restoration.

**ARTICLE 2 – THE PROJECT**

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

CTH N STORM WATER MANAGEMENT FACILITY AND  
YARD WASTE TRANSFER SITE CONSTRUCTION,  
CONTRACT B-21  
TOWN OF BUCHANAN, OUTAGAMIE COUNTY, WI

**ARTICLE 3 – ENGINEER**

3.01 The Project has been designed by Cedar Corporation.

3.02 The Owner has retained Cedar Corporation (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

**ARTICLE 4 – CONTRACT TIMES**

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

#### 4.02 *Contract Times:*

1. The Work will be substantially completed within 75 calendar days and as noted in the phasing schedule below and, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 15 calendar days after substantial completion date.
2. Substantial Completion dates and phasing of the Project as noted below:
  - a. Phase 1
    - 1) N130 CTH N House Demo, Yard Waste Site Removals, Storm Water Pond Excavation, Yard Waste Site Excavation, Crushed Aggregate Base Course Placement for Yard Waste Site and Storm Sewer Work:
      - i) Start Work on or about November 1, 2021.
      - ii) Suspension of work on December 17, 2021. Contract may allow work past December 17, 2021, pending weather conditions and approval from Engineer and Owner.
    - Or-
    - iii) Start all Work on or about April 1, 2022, with completion by June 30, 2022. All access to Site off of CTH N until road weight limit restrictions are off.
  - b. Phase 2
    - 1) N124 CTH N House Demo, Yard Waste Site Asphalt Pavement, Fencing/Gates, Final Landscape Restoration, and Complete Remaining Storm Sewer:
      - i) Start Phase 2 Work on or about April 1, 2022.
      - ii) Substantial Completion by June 30, 2022.
3. All Work shall be completed and ready for final payment by June 30, 2022.

#### 4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
  1. Substantial Completion: Contractor shall pay Owner \$1,200 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$700 for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

**ARTICLE 5 – CONTRACT PRICE**

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

- A. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item).
- B. The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.
- C. Total of all extended prices for Unit Price Work:

\_\_\_\_\_ (\$ \_\_\_\_\_ )  
 (Write Out) (Numbers)

**ARTICLE 6 – PAYMENT PROCEDURES**

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor’s Applications for Payment on or about the third Tuesday of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
  1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

- a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
  - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 97.5 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

#### 6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

### **ARTICLE 7 – INTEREST**

- 7.01 All amounts not paid when due shall bear interest at the maximum rate allowed by law at the place of the Project.

### **ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS**

- 8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:
- A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
  - B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  - C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
  - D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.



- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

## **ARTICLE 9 – CONTRACT DOCUMENTS**

### 9.01 *Contents*

- A. The Contract Documents consist of the following:
  - 1. This Agreement (pages 1 to \_\_\_\_, inclusive).
  - 2. Performance bond (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 3. Payment bond (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 4. Other bonds.
    - a. None.
  - 5. General Conditions (pages 1 to 72, inclusive).
  - 6. Supplementary Conditions (pages \_\_\_\_ to \_\_\_\_, inclusive).
  - 7. Specifications as listed in the table of contents of the Project Manual.
  - 8. Drawings (not attached but incorporated by reference) consisting of \_\_\_\_ sheets with each sheet bearing the following general title: \_\_\_\_\_  
[or] the Drawings listed on the attached sheet index.

9. Addenda (numbers \_\_\_ to \_\_\_, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
  - a. Contractor's Bid (pages \_\_\_ to \_\_\_, inclusive).
  - b. Wage Rates (if applicable).
11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
  - a. Notice to Proceed.
  - b. Work Change Directives.
  - c. Change Orders.
  - d. Field Orders.
  - e. Contractor Payment Request.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

## **ARTICLE 10 – MISCELLANEOUS**

### *10.01 Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

### *10.02 Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### *10.03 Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Contractor's Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
  1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
  4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Contract).

OWNER:

CONTRACTOR:

Town of Buchanan

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

*(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

Attn: Town Administrator

\_\_\_\_\_

N178 County Road N

\_\_\_\_\_

Appleton, WI 54915

\_\_\_\_\_

License No.: \_\_\_\_\_  
*(where applicable)*

**SECTION 00 55 00**  
**NOTICE TO PROCEED**

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Owner:	Owner's Contract No:
Contractor:	Contractor's Project No:
Engineer:	Engineer's Project No:
Project:	Contract Name:
	Effective Date of Contract:

**Phase:**

---

**TO CONTRACTOR:**

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on \_\_\_\_\_, 20\_\_.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, the date of Substantial Completion is \_\_\_\_\_, and the date of readiness for final payment is \_\_\_\_\_.

\_\_\_\_\_  
(Owner)

By: \_\_\_\_\_  
(Authorized Signature)

\_\_\_\_\_  
(Title)

**ACCEPTANCE OF NOTICE**

\_\_\_\_\_  
(Contractor)

By: \_\_\_\_\_  
(Authorized Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date)

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**SECTION 00 61 13.13  
PERFORMANCE BOND**

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

**CONSTRUCTION CONTRACT**

Effective Date of the Agreement:

Amount:

Description *(name and location):*

**BOND**

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form:  None  See Paragraph 16

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Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

**CONTRACTOR AS PRINCIPAL**

**SURETY**

\_\_\_\_\_  
Contractor's Name and Corporate Seal *(seal)*

\_\_\_\_\_  
Surety's Name and Corporate Seal *(seal)*

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

**Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.**

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a

qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

#### 14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all

valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

**SECTION 00 61 13.16  
PAYMENT BOND**

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

**CONSTRUCTION CONTRACT**

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

**BOND**

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form:  None  See Paragraph 18

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Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

**CONTRACTOR AS PRINCIPAL**

**SURETY**

\_\_\_\_\_  
Contractor's Name and Corporate Seal *(seal)*

\_\_\_\_\_  
Surety's Name and Corporate Seal *(seal)*

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature *(attach power of attorney)*

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

**Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.**

*This page intentionally left blank.*

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
  - 5.1 Claimants who do not have a direct contract with the Contractor,
    - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
    - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
  - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
  - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
  - 7.2 Pay or arrange for payment of any undisputed amounts.
  - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of

one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

## 16. Definitions

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also

includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:



**Unit Price Progress Estimate**

**Contractor's Application**

Project:										Application Number:										
Application Period:										Application Date:										
Bid No.	Item Description	Estimated Bid Quantity	Unit Price	B			C			D			E		F	G	H	I	J	
				Previous Applications Quantity	Previous Applications Amount	Quantity This Application	Quantity This Application	Quantity This Application	Materials Stored	Quantity	Amount	Quantity	Amount	Quantity						Amount
<b>TOTAL</b>																				





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**SECTION 00 63 63  
CHANGE ORDER**

**Change Order No.** \_\_\_\_\_

Date of Issuance:

Effective Date:

Owner:

Owner's Contract No.:

Contractor:

Contractor's Project No.:

Engineer:

Engineer's Project No.:

Project:

Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

<b>CHANGE IN CONTRACT PRICE</b>	<b>CHANGE IN CONTRACT TIMES</b> <i>[note changes in Milestones if applicable]</i>
Original Contract Price: \$ _____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ Days
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

<p><b>RECOMMENDED:</b></p> <p>By: _____           Engineer (if required)</p> <p>Title: _____</p> <p>Date: _____</p>	<p><b>ACCEPTED:</b></p> <p>By: _____           Owner (Authorized Signature)</p> <p>Title: _____</p> <p>Date: _____</p>	<p><b>ACCEPTED:</b></p> <p>By: _____           Contractor (Authorized Signature)</p> <p>Title: _____</p> <p>Date: _____</p>
---	--	---

Approved by Funding Agency (if applicable)

By: \_\_\_\_\_  
Title: \_\_\_\_\_

Date: \_\_\_\_\_

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



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**STANDARD GENERAL CONDITIONS OF THE  
CONSTRUCTION CONTRACT**

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. *Bidder*—An individual or entity that submits a Bid to Owner.
  6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision



regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and

equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## 1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents; or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. *Furnish, Install, Perform, Provide:*
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2 – PRELIMINARY MATTERS**

### **2.01 *Delivery of Bonds and Evidence of Insurance***

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

### **2.02 *Copies of Documents***

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

### **2.03 *Before Starting Construction***

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
  2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

#### 2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

#### 2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
  3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

#### 2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items

resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

### **ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE**

#### **3.01 *Intent***

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

#### **3.02 *Reference Standards***

- A. Standards Specifications, Codes, Laws and Regulations
  - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

#### **3.03 *Reporting and Resolving Discrepancies***

- A. *Reporting Discrepancies:*
  - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer

any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
  - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give



written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
  - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
  - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

## **ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

### 4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

### 4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

### 4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

### 4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
  2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  2. abnormal weather conditions;
  3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
  4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

**ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

- 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
- 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

### 5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
  - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
  - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
  - 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
  - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
  - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

#### 5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
  2. is of such a nature as to require a change in the Drawings or Specifications; or
  3. differs materially from that shown or indicated in the Contract Documents; or
  4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
    - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
    - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
    - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
  3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

#### 5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
  1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
    - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
  - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
    - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
    - d. Contractor gave the notice required in Paragraph 5.05.B.
  - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
  2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in



question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 6 – BONDS AND INSURANCE

### 6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

### 6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the

Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

### 6.03 *Contractor's Insurance*

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
  - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
  4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
  2. claims for damages insured by reasonably available personal injury liability coverage.
  3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
    - a. Such insurance shall be maintained for three years after final payment.
    - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Broad form property damage coverage.
  4. Severability of interest.
  5. Underground, explosion, and collapse coverage.
  6. Personal injury coverage.
  7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
  8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to

industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

- F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
  - 1. include at least the specific coverages provided in this Article.
  - 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
  - 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
  - 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
  - 5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

#### 6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

#### 6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
  - 1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
  - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
  - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
  5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
  6. extend to cover damage or loss to insured property while in transit.
  7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
  8. allow for the waiver of the insurer's subrogation rights, as set forth below.
  9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
  10. not include a co-insurance clause.
  11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
  12. include performance/hot testing and start-up.
  13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such

property item will be responsible for deciding whether to insure it, and if so in what amount.

#### 6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
  - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
  - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.



#### 6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

### **ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES**

#### 7.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

#### 7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

#### 7.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and

incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

#### 7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
      - 3) it has a proven record of performance and availability of responsive service; and
      - 4) it is not objectionable to Owner.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional

data about the proposed “or-equal” item. Engineer will be the sole judge of acceptability. No “or-equal” item will be ordered, furnished, installed, or utilized until Engineer’s review is complete and Engineer determines that the proposed item is an “or-equal”, which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer’s Determination:* Neither approval nor denial of an “or-equal” request shall result in any change in Contract Price. The Engineer’s denial of an “or-equal” request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

#### 7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
  - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
  - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
  - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
    - a. shall certify that the proposed substitute item will:
      - 1) perform adequately the functions and achieve the results called for by the general design,
      - 2) be similar in substance to that specified, and
      - 3) be suited to the same use as that specified.
    - b. will state:
      - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
      - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

- 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
  - c. will identify:
    - 1) all variations of the proposed substitute item from that specified, and
    - 2) available engineering, sales, maintenance, repair, and replacement services.
  - d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

#### 7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.
- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- O. Nothing in the Contract Documents:
  - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
  - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

#### 7.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a

negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

#### 7.09 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

#### 7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.11 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

#### 7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;
  2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### 7.13 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.



#### 7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

#### 7.16 *Shop Drawings, Samples, and Other Submittals*

##### A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
  - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

##### 1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.

- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.
2. *Samples:*
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
  3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. *Engineer's Review:*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
  5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
  6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  1. observations by Engineer;
  2. recommendation by Engineer or payment by Owner of any progress or final payment;
  3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  4. use or occupancy of the Work or any part thereof by Owner;
  5. any review and approval of a Shop Drawing or Sample submittal;
  6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or
  8. any correction of defective Work by Owner.
- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

#### 7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must

satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

## **ARTICLE 8 – OTHER WORK AT THE SITE**

### **8.01 *Other Work***

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such

other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

#### 8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
  - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's

other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

## **ARTICLE 9 – OWNER'S RESPONSIBILITIES**

### **9.01 *Communications to Contractor***

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### **9.02 *Replacement of Engineer***

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

### **9.03 *Furnish Data***

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### **9.04 *Pay When Due***

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

### **9.05 *Lands and Easements; Reports, Tests, and Drawings***

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### **9.06 *Insurance***

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

**ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION**

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep



Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

#### 10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

#### 10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

#### 10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

#### 10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

#### 10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

#### 10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to

exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

#### 10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

### **ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

#### 11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
  - 1. *Change Orders:*
    - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
    - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
  - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification

ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

#### 11.02 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

#### 11.03 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

#### 11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

- B. An adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

#### 11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

#### 11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.
  - 1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
  - 2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
  - 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

### 11.07 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
  - 1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
  - 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  - 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
  - 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

### 11.08 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

## **ARTICLE 12 – CLAIMS**

### 12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
  - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
  - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of

Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
  - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
  - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.
  - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval:* If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim:* If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results:* If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

## **ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### **13.01 Cost of the Work**

- A. *Purposes for Determination of Cost of the Work:* The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  - 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined

on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
  2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
  3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
  4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
  5. Supplemental costs including the following:
    - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
    - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.



- c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
  - g. The cost of utilities, fuel, and sanitary facilities at the Site.
  - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
  - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:
- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
  - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.
- E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

### 13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
  1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
  2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

### 13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual

conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
  - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
  - 2. there is no corresponding adjustment with respect to any other item of Work; and
  - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

#### **ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

##### **14.01 Access to Work**

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

##### **14.02 Tests, Inspections, and Approvals**

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
  - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  - 3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's

evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

#### 14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
  - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
  - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

#### 14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### 14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if

Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

## **ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

### **15.01 Progress Payments**

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
  - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
  - 2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - a. to supervise, direct, or control the Work, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
  - 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
  - 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
    - a. the Work is defective, requiring correction or replacement;
    - b. the Contract Price has been reduced by Change Orders;
    - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
    - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
    - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.
- D. *Payment Becomes Due:*
- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.
- E. *Reductions in Payment by Owner:*
- 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
    - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
    - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
    - c. Contractor has failed to provide and maintain required bonds or insurance;
    - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
    - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
    - f. the Work is defective, requiring correction or replacement;
    - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;



- h. the Contract Price has been reduced by Change Orders;
  - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
  - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
  - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

#### 15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

#### 15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not

substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### 15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
  - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
  - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
  - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

#### 15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 15.06 *Final Payment*

##### A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents;
  - b. consent of the surety, if any, to final payment;
  - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
  - d. a list of all disputes that Contractor believes are unsettled; and
  - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

##### B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under

the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

#### 15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

#### 15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. correct the defective repairs to the Site or such other adjacent areas;
  - 2. correct such defective Work;
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## **ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION**

### *16.01 Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

### *16.02 Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
  1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
  2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
  4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
  2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

### 16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
  3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

**ARTICLE 17 – FINAL RESOLUTION OF DISPUTES**

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
  - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
  - 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
  - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
  - 2. agree with the other party to submit the dispute to another dispute resolution process; or
  - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

## ARTICLE 18 – MISCELLANEOUS

### 18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
  - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
  - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

### 18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

### 18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

### 18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

### 18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

### 18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

### 18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

### 18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.



**SECTION 00 73 00**  
**SUPPLEMENTARY CONDITIONS**

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

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**ARTICLE 1 – DEFINITIONS AND TERMINOLOGY**

***SC-1.01 Defined Terms***

SC-1.01.A.48 Add the following language at the end of the last sentence of Paragraph 1.01.A.48:

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC-1.01A.49 Add the following new paragraph after Paragraph 1.01.A.48:

Abnormal Weather Conditions - Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

**ARTICLE 2 – PRELIMINARY MATTERS**

***SC-2.02 Copies of Documents***

SC-2.02.A. Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

A. Owner shall furnish to Contractor three (3) printed or hard copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional copies will be furnished upon request at the cost of reproduction.

### ***SC-2.05 Initial Acceptance of Schedules***

SC-2.05.A.3 Add the following sentence to the end of Paragraph 2.05.A.3.: “Unit quantities and unit prices will be utilized for unit price work.”

### ***SC-2.06 Electronic Transmittals***

SC-2.06.B. Delete Paragraph 2.06.B. in its entirety and insert the following in its place [Deleted].

SC-2.06.C. Delete Paragraph 2.06.C. and insert the following in its place:

- C. When Contractor transmits items in electronic media or digital format, the items shall be compatible with Engineer’s software application packages, operating systems, and computer hardware.

## **ARTICLE 4 - COMMENCEMENT AND PROGRESS OF THE WORK**

### ***SC-4.01 Commencement of Contract Times; Notice to Proceed***

SC-4.01.A Amend the last sentence of Paragraph 4.01A to read as follows:

In no event will the Contract Times commence to run later than the thirtieth day after the Effective Date of the Contract.

## **ARTICLE 5 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

### ***SC-5.03 Subsurface and Physical Conditions***

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

- C. In the preparation of Drawings and Specifications, Engineer relied upon the following reports of explorations and tests of subsurface conditions at the Site:
  - 1. Report dated August 26, 2019, prepared by Intertek PSI, entitled: Visual Soil Classification: Soil Borings, North 124 County Road N, Town of Buchanan, Wisconsin consisting of 7 pages. The technical data contained in such report upon which Contractor may rely is soil information.
- D. Copies of reports and drawings itemized in SC-5.03.C that are not included with Bidding Documents may be examined at Cedar Corporation, 1695 Bellevue Street, Green Bay, WI 54311, during regular business hours. These reports are not part of the Contract Documents. The “technical data” contained therein upon which Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer in the preparation of Drawings and Specifications.

***SC-5.06 Hazardous Environmental Conditions***

SC 5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.
- B. Not Used.

**ARTICLE 6 – BONDS AND INSURANCE**

***SC-6.03 Contractor’s Liability Insurance***

SC-6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

- 1. Workers’ Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	<u>Statutory</u>
Federal, if applicable (e.g., Longshoreman’s):	<u>Statutory</u>

Employer’s Liability:

Bodily injury, each accident	\$ <u>100,000</u>
Bodily injury by disease, each employee	\$ <u>100,000</u>
Bodily injury/disease aggregate	\$ <u>500,000</u>

For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker’s compensation or commercial general liability policy with a minimum limit of:

\$ 500,000

- 2. Contractor’s Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate \$ 2,000,000

Products - Completed Operations Aggregate \$ 2,000,000

Personal and Advertising Injury \$ 1,000,000

- Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000
3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:
- Bodily Injury:
- Each person \$ 1,000,000
- Each accident \$ 1,000,000
- Property Damage:
- Each accident \$ 500,000
- [or]*
- Combined Single Limit of \$ 1,000,000
4. Excess or Umbrella Liability:
- Per Occurrence \$ 5,000,000
- General Aggregate \$ 5,000,000
5. Contractor's Pollution Liability:
- Each Occurrence \$ N/A
- General Aggregate \$ N/A
- If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract
6. Additional Insureds:
- In addition to Owner (Town of Buchanan) and Engineer (Cedar Corporation), include as additional insureds the following:  
None, by endorsement as additional insureds.
7. The Owner will consider a policy with lower employer liability limits and a larger umbrella liability policy provided the Contractor can demonstrate that the umbrella policy provides equal or greater coverage than the basic requirement.

### ***SC-6.05 Property Insurance***

SC-6.05.A.1 Add the following new subparagraph after subparagraph 6.05.A.1:

- a. In addition to Owner, Contractor, and all Subcontractors, include as insureds the following: Engineer, Cedar Corporation.

## **ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES**

### ***SC-7.01 Supervision and Superintendence***

SC-7.01 Delete Paragraph 7.01 B in its entirety and insert the following:

- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall be present at all times during construction of the project and shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor’s representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

### ***SC-7.02 Labor; Working Hours***

SC-7.02.B. Add the following new subparagraph immediately after Paragraph 7.02.B:

1. Regular working hours will be 7:00 a.m. to 6:00 p.m.

### ***SC-7.06 Concerning Subcontractors, Suppliers, and Others***

SC-7.06.A Amend Paragraph 7.06.A by adding the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

### ***SC-7.08 Permits***

SC-7.08.A Add a new paragraph immediately after Paragraph GC-7.08 A:

- B. The Owner shall be responsible for obtaining the following permit(s):
  1. WDNR – Notice of Intent (NOI) Storm Water Permit.
  2. Outagamie County Zoning – Conditional Use Permit.
  3. WDNR – Funding Program.

### ***SC-7.09 Taxes***

SC 7.09 Add a new paragraph immediately after Paragraph 7.09.A:

- B. Contractor shall become aware of and comply with Sec. 77.54 (9m) Wis. Stats, which is effective as of January 1, 2016. The sale of and the storage, use, or other consumption of tangible personal property, or items or property sold to a construction contractor who, in fulfillment of a real property activity, transfers the tangible personal property, or items or property to local units of government such as a county, city, village, town, or school district, or to a nonprofit organization as part of constructing the “facility”, is EXEMPT from the sales tax and the use tax. The “facility” means any building, shelter, parking lot, parking garage, athletic field, athletic park, storm sewer, water supply system or sewerage and waste water treatment facility, but does not include a highway, street, or road.

### ***SC-7.11 Record Documents***

SC-7.11 Add a new paragraph immediately after Paragraph 7.11.A:

- B. The Contractor shall excavate all points which are not adequately referenced on the Contractor’s copy of the annotated record documents at his own expense so necessary measurements can be made.

### ***SC-7.15 Emergencies***

SC-7.15 Add a new paragraph immediately after Paragraph 7.15 A:

- B. In emergencies affecting the safety or protection of persons or property or maintenance of temporary construction at the site or adjacent thereto, and Contractor cannot be reached, Owner may act to attempt to prevent threatened damage, injury, or loss. Owner will give Contractor and Engineer prompt written notice of such action and the cost of the correction or remedy shall be charged against Contractor. A Change Order will be issued to document the change in Contract Price.

## **ARTICLE 9 – OWNER’S RESPONSIBILITIES**

### ***SC-9.11 Evidence of Financial Arrangements***

Delete Paragraph 9.11 in its entirety.

## ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

### *SC-10.03 Project Representative*

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

- B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.
1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
  2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
  3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.
  4. Liaison:
    - a. Serve as Engineer’s liaison with Contractor. Working principally through Contractor’s authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
    - b. Assist Engineer in serving as Owner’s liaison with Contractor when Contractor’s operations affect Owner’s on-Site operations.
    - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
  5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
  6. Shop Drawings and Samples:
    - a. Record date of receipt of Samples and Contractor-approved Shop Drawings.

- b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
  - c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.
7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
8. Review of Work and Rejection of Defective Work:
- a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
  - b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
9. Inspections, Tests, and System Start-ups:
- a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
  - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
10. Records:
- a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities,



decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

- b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
- c. Maintain records for use in preparing Project documentation.

11. Reports:

- a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
- b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
- c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

13. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

14. Completion:

- a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

- b. Participate in Engineer’s final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.
- c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

C. The RPR shall not:

- 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including “or-equal” items).
- 2. Exceed limitations of Engineer’s authority as set forth in the Contract Documents.
- 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
- 4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor’s work.
- 5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
- 6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
- 7. Authorize Owner to occupy the Project in whole or in part.

**ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

***SC-13.02 Allowances***

SC-13.02.C. Delete Paragraph 13.02.C. in its entirety and insert the following in its place:

[Deleted]

***SC-13.03 Unit Price Work***

SC 13.03.E Delete Paragraph 13.03.E in its entirety and insert the following in its place:

- E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and
2. if there is no corresponding adjustment with respect to any other item of Work; and
3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.

## **ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

### ***SC-15.01 Progress Payments***

SC-15.01.B Amend the second sentence of Paragraph 15.01.B.1 by striking out the following text: “a bill of sale, invoice, or other.”

SC-15.01.B.1 Amend the first sentence changing 20 days to 10 days.

SC-15.01.B.3 Add the following language at the end of Paragraph 15.01.B.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-15.01.D.1 Amend the first sentence changing “Ten days” to “Twenty days”.

### ***SC-15.02 Contractor’s Warranty of Title***

SC-15.02.A Amend Paragraph 15.02.A by striking out the following text: “no later than seven days after the time of payment by Owner” and insert “no later than the time of payment by Owner.”

### ***SC-15.03 Substantial Completion***

SC-15.03.A Add the following Paragraph immediately following GC-15.03.A:

The completion of the following list of items is not a requirement for Substantial Completion: Landscape Restoration, Fence, Pavement Marking.

SC-15.03.B Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

### ***SC-15.06 Final Payment***

SC-15.06.D. Amend the paragraph immediately following “liquidated damages,” to add the following “and all additional costs for Engineer’s services beyond Substantial and Final Completion dates.”

SC-15.08.A. In the first line of this paragraph, replace “one year” with “two years”, except Landscape Restoration warranty shall be “one year”.

## **END OF SUPPLEMENTARY CONDITIONS**

**SECTION 00 73 93  
CERTIFICATE OF OWNER'S ATTORNEY**

I, the undersigned, \_\_\_\_\_, the duly authorized and acting legal representative of \_\_\_\_\_, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

\_\_\_\_\_

Date: \_\_\_\_\_

Note: Delete phrase "performance and payment bonds" when not applicable.

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

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Summary of Work
    - a. Work Covered by Contract Documents
    - b. Work by Owner
  - 2. Work Restrictions
    - a. Access to Site
    - b. Coordination with Occupants
    - c. Use of Site
    - d. Work in Rights-of-Way
    - e. Work Sequence
  - 3. Project Utility Sources

**1.02 SUMMARY OF WORK**

- A. Work Covered by Contract Documents
  - 1. Location: N124 and N130 CTH N and surrounding easement areas in the Town of Buchanan, Outagamie County, Wisconsin.
  - 2. The Work includes:
    - a. Trenching, backfilling and compacting
    - b. Storm water
    - c. Crushed aggregate base course
    - d. Concrete work
    - e. Asphalt pavement
    - f. Excavation and grading

- g. Landscape restoration
    - h. Building demolition
- B. Work by Owner
  - 1. General
    - a. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
    - b. Coordinate the Work of this Contract with work performed under separate contracts.
  - 2. Preceding Work
    - a. Owner will be conducting fire training on existing homes of N124 and N130 CTH N.
    - b. Owner shall disconnect all utilities to homes at N124 and N130 CTH N.
  - 3. Concurrent Work
    - a. The following operations will be conducted simultaneously with the work under this Contract.
      - (1) Fire training on existing N124 and N130 houses prior to demolition.

### **1.03 WORK RESTRICTIONS**

- A. Access to Site
  - 1. Access to the Site is limited to N124 and N130 properties along with all drainage/storm sewer easements and temporary construction easements.
  - 2. Road limits must be adhered to.
- B. Use of Site
  - 1. General
    - a. Contractor shall have full use of the Site for construction operations as allowed by law, ordinances, permits, easement agreements and the Contract Documents.



- b. Limit Use of the Site by Owner's right to perform work or to retain other contractors on portions of the Project.
- c. The Project Site is limited to property boundaries, rights-of-way, easements and other areas designated in the Contract Documents.
- d. Provide protection and safekeeping of material and products stored on or off the Site.
- e. Move any stored material or products that interfere with operations of Owner or other Contractors.

2. Use of the Site

- a. Limit use of premises to work in areas or areas within the Contract limits indicated.
- b. Do not disturb portions of Project Site beyond areas in the indicated Work.
- c. Confine construction operations to limits shown on the Drawings.
- d. Allow for Owner occupancy of Project site and use by the public.
- e. Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
- f. Coordinate and obtain concurrence for any utility service disruptions with affected property owners.
- g. Coordinate and obtain concurrence for any access disruptions and access changes with affected property owners.
- h. Coordinate and obtain concurrence for any disruption or relocation for mail service, garbage pick-up service, school bus service and any other normal occupant service with affected property owners.

C. Work in Rights-of-Way

- 1. Keep driveways, loading areas, and entrances serving premises clear and available to residents and emergency vehicles at all time. Do not use these areas for parking or storage of materials.
- 2. Continuously keep rights- of- way, storage areas, streets, roads, highways and adjacent properties free from accumulations of waste materials, excess excavation, rubbish and windblown debris resulting from construction operations.

3. Broom or water clean paved surfaces and remove surplus materials, tools, construction equipment and machinery as each work area is completed.
4. Protect and avoid damage within the work area.
  - a. Protect and avoid damage to trees or shrubbery within the work area not designated for removal.
  - b. Adequately close and protect all excavations, equipment, and materials stored within the Site of the Project.
  - c. Do not interfere with or create any hazards to traffic.
  - d. Control dust on all roads, drives, walkways, and parking areas.
  - e. Provide protection of all existing equipment located throughout the Project area.
5. Public Relations
  - a. Where operations of the Contractor require personal contact with the public, the Contractor and all his employees shall act in a courteous and respectful manner when in contact with the public.
  - b. Provide all means necessary to control dust on and near the work, including off-site borrow and stockpile areas as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
  - c. Minimize interference with traffic.
  - d. Provide and maintain ingress and egress for all residents along the construction route.
  - e. Notify all local emergency services, school districts, and other public agencies with regard to access, control and maintenance of traffic in the work area.
  - f. Obey and follow all posted speed limits.

D. Work Sequence

1. Perform Construction Work sequencing as required to meet the Contract Times and stated in the Agreement.
2. Provide access to properties affected by the construction activities.
3. Protect road surfaces from damage and debris outside the construction Site and the areas not scheduled for replacement.

4. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
5. Do not interrupt delivery of mail service, garbage pickup, school buses, emergency vehicles and other normal municipal operations.
6. Do not interrupt utilities serving property owners and facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - a. Notify Owner and property owner not less than 2 days in advance of proposed utility interruptions.
  - b. Obtain Owner's written permission before proceeding with utility interruptions.
  - c. Provide temporary utility service if service is interrupted for more than 4 hours.
7. One road lane shall remain open to traffic at all times.

#### **1.04 PROJECT UTILITY SOURCES**

##### **A. Roads**

1. Town of Buchanan  
Attn: Maggie Mahoney, Town Administrator  
N178 County Road N  
Appleton, WI 54915  
(920) 734-8599

##### **B. Water and Sewer**

1. Darboy Joint Sanitary District  
Attn: Pat Hennessey  
N398 County Road N  
Appleton, WI 54915  
(920) 788-6048  
(920) 419-2611 (cell)

C. Gas and Electric

1. WE Energies – Gas  
Attn: Cody Beckman, Energy Services Consultant (Gas)  
P.O. Box 1699, 800 S. Lyndale Drive  
Appleton, WI 54912-1699  
(920) 380-3422  
**Emergency Hotline: (800) 261-5325 (Gas)**
2. WE Energies – Electric  
Attn: Zach Duga, Energy Services Consultant (Electric)  
P.O. Box 1699, 800 S. Lyndale Drive  
Appleton, WI 54912-1699  
(920) 380-3458  
**Emergency Hotline: (800) 662-4797 (Electric)**

D. Cable

1. Charter Communications  
Attn: Vince Albin  
3520 Destination Drive  
Appleton, WI 54915  
(920) 831-9249  
(920) 378-0444 (cell)

E. Telephone

1. AT & T  
Attn: Joseph Kassab  
205 S Jefferson Street  
Green Bay, WI 54301  
(920) 433-4200 (office)  
(920) 202-4002 (cell)

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

**SECTION 01 21 00  
ALLOWANCES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Testing and Inspection Allowances.
  - 2. Yard Waste Transfer Site Equipment and Material Allowances.
- B. Allowances indicated in the Bid Form shall be included in the Contract Amount.
- C. Selected items are specified in the Contract Documents by allowances.
- D. Allowances are established in lieu of additional requirements and to defer selection of actual materials, equipment or quantity to a later date when additional information is available for evaluation.

**1.02 SELECTION AND PURCHASE**

- A. At the earliest practical date after award of the Contract, advise Engineer of the date when final selection and purchase of each product or service described by an allowance needs to be completed to avoid delaying the Work.
- B. Obtain proposals for each allowance for use in making final selections of products or services. Include recommendations that are relevant to performing the Work.
- C. Purchase products and services selected by the Owner from the designated supplier.

**1.03 ALLOWANCE COSTS**

- A. Include cost to Contractor of specific products, materials, or services ordered by Owner or selected by the Engineer under allowance and include taxes, freight, and delivery to the Project Site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products, materials or services ordered by Owner or selected by Engineer under allowance shall be included as part of the Contract Price elsewhere and not part of the allowance.

- C. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
  - 1. If requested by Engineer, retain and prepare unused material for storage by Owner.
  - 2. Deliver unused material to Owner's storage space as directed.
- D. Adjustment of Allowances
  - 1. If the cost of materials, services or equipment exceeds that set forth in the allowance, the Owner will reimburse the Contractor for the additional cost.
  - 2. If the cost of materials, services or equipment is less than as set forth in the allowance, the Contractor will credit the Owner for the difference between cost as stated in the allowance and the actual cost.
  - 3. A Change Order will adjust the final allowance amount.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination
  - 1. Coordinate allowance items with other portions of the Work.
  - 2. Furnish templates as required to coordinate execution.
  - 3. Arrange for and submit shop drawings, product data and samples, as required.
  - 4. Arrange for pick-up, delivery, handling and storage of products.

#### **1.05 SUBMITTALS**

- A. Action Submittals
  - 1. Submit proposals for purchase of products or systems included in allowances.
- B. Informational Submittals
  - 1. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
  - 2. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

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

- A. Delivery and Acceptance Requirements
  - 1. Upon delivery, promptly inspect products for damage or defects.
  - 2. Return, replace or repair products, as appropriate, where damage or defects are found and process claims for transportation damage.

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

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects.
- B. Return damaged or defective products to manufacturer for replacement.

### **3.02 PREPARATION**

- A. Coordinate materials and installation for each allowance with related materials and installations to ensure complete integrated and interfaced with related work.

### **3.03 ALLOWANCE DESCRIPTIONS**

- A. Testing and Inspecting Allowances
  - 1. Testing and inspecting allowances include the cost of actual tests and inspections, and reporting results by testing agency.
  - 2. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure.
  - 3. Costs of services not required by the Contract Documents are not included in the allowance.
  - 4. Testing and Inspecting Allowances include the following Specification Sections:
    - a. Earthwork
    - b. Crushed Aggregate Base Course
    - c. Asphaltic Concrete Pavement

- d. Concrete Driveway Construction
  - e. Trenching, Backfilling and Compacting
- B. Yard Waste Transfer Site Equipment and Material Allowances

**3.04 SCHEDULE OF ALLOWANCES**

- A. Testing and Inspecting Allowances, allow the lump sum amount of: \$5,000
- B. Yard Waste Transfer Site Equipment and Material Allowances
  - 1. Sliding Entrance Gate and associated electronic components for automated access to Yard Waste Transfer Facility, allow the lump sum amount of: \$25,000
  - 2. Yard Waste Transfer Site Security System and all associated electrical components, allow the lump sum amount of: \$15,000
- C. TOTAL ALL ALLOWANCES: \$45,000

**END OF SECTION**



**SECTION 01 22 01**  
**UNIT PRICES – TEMPORARY FACILITIES AND CONTROLS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes:
1. Temporary Vehicular Access and Parking
    - a. Traffic Control
  2. Temporary Controls
    - a. Temporary Erosion and Sediment control
      - (1) Rock Filled Filter Bags
      - (2) Temporary Silt Fence
      - (3) Temporary Storm Drain Inlet Protection Erosion Control
      - (4) Temporary Stone Tracking Pad
- B. Unit Prices include:
1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  2. The method of measurement for payment.
  3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item of the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
  2. Project Management and Coordination

3. Photographic Documentation
4. Submittal Procedures
5. Quality Requirements
6. Temporary Facilities and Controls
7. Field Engineering
8. Equipment Installation
9. Cutting and Patching
10. Starting and Adjusting
11. Closeout Procedures
12. Operation and Maintenance Documentation
13. Project Record Documents
14. Demonstration and Training
15. Selective Site Demolition and Utilities Abandonment
16. Trenching and Backfill
17. Subsurface exploration for locating existing utilities
18. Pipe bedding
19. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
20. If crossing or undermining of existing public or private utility, then include:
  - a. Maintaining the utility in service.
  - b. Replacing of existing utilities, if damaged.
  - c. Providing support and bedding material.
  - d. Trench maintenance.

### **1.03 TEMPORARY VEHICULAR ACCESS AND PARKING**

- A. Traffic Control

1. The unit price for traffic Control work includes:
  - a. General Work Items of Article 1.02.
  - b. Obtaining permits.
  - c. Notifications.
  - d. Barricades.
  - e. Traffic control flag personnel.
  - f. Signing.
2. Measurement for payment will not be made.
3. The unit of measurement for payment is lump sum.

#### **1.04 TEMPORARY CONTROLS**

##### **A. Temporary Erosion and Sediment Control**

1. Rock Filled Filter Bags
  - a. The unit price for Rock Filled Filter Bags for Erosion Control work includes:
    - (1) General Work Items on Article 1.02.
    - (2) Provide HDPE bags filled with aggregate material.
    - (3) Provide anchor stakes.
    - (4) Excavate and embed the bags.
    - (5) Inspection and maintenance of the bags.
    - (6) Removal of the bags.
    - (7) Finish grading.
    - (8) Seed, fertilize, and mulch area around the removed erosion bags that does not have established turf.
  - b. Measurement for payment will be the actual number of rock filled filter bags installed.
  - c. The unit of measurement for payment is each.

2. Temporary Silt Fence

- a. The unit price for Silt Fence Erosion Control work includes:
- (1) General Work Items of Article 1.02.
  - (2) Fabric and posts.
  - (3) Excavation to anchor fabric and compact soil or provide soil to anchor the fabric.
  - (4) Inspection and maintenance of the installed silt fence.
  - (5) Removal of the silt fence.
  - (6) Removal and disposal of trapped sediment.
  - (7) Finish grading.
  - (8) Seeding, fertilizing, mulching area around the removed silt fence that does not have established turf.
- b. Measurement for payment will be the actual horizontal length installed.
- c. The unit of measurement for payment is linear feet.

3. Temporary Storm Drain Inlet Protection Erosion Control

- a. The unit price for Temporary Storm Drain Inlet Protection for Erosion Control work includes:
- (1) General Work Items of Article 1.02.
  - (2) Provide geotextile and wood materials for type shown on the Drawings.
  - (3) Placing inlet protection system.
  - (4) Inspection and maintenance of the installed inlet protection.
  - (5) Removal of the inlet protection.
  - (6) Cleaning debris buildup around inlet.
- b. Measurement for payment will be the actual number installed.
- c. The unit of measurement for payment is each.

4. Temporary Stone Tracking Pad
  - a. The unit price for Temporary Stone Tracking Pad includes:
    - (1) General Work Items of Article 1.02.
    - (2) Install to the dimensions as shown on the Drawings.
    - (3) Providing filter fabric.
    - (4) Providing crushed aggregate base course (3" clear stone)
    - (5) Daily maintenance of aggregate.
    - (6) Removal of aggregate and restore with topsoil, seed, fertilizer and mulch.
  - b. Measurement for payment shall be the actual number installed, except 25% of payment will be withheld until removal is completed and turf is restored.
  - c. The unit of measurement for payment is each.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

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**SECTION 01 22 02**  
**UNIT PRICES - EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Examination and Preparation
    - a. Mobilization
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  - 2. The method of measurement for payment.
  - 3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
  - 1. Project Management and Coordination
  - 2. Quality Requirements

**1.03 EXAMINATION AND PREPARATION**

- A. Mobilization
  - 1. The unit price for Mobilization work includes:
    - a. Determine appropriate personnel, tools, equipment, materials, supplies, and incidentals required to properly perform the Work.
    - b. Move appropriate personnel, tools, equipment, materials, supplies, and incidentals to the Project Site as required to perform the Work.

- c. Upon completion of the Work, remove personnel, tools, equipment, materials, supplies, and incidentals from the Project Site.
  - d. Restore disturbed areas outside the Project Site to a preconstruction condition.
- 2. Measurement for payment will be based on all required personnel, tools, equipment, materials, supplies, and incidentals delivered to the Site and removed from the Site.
  - 3. The unit of measurement for payment is lump sum with  $\frac{1}{2}$  the lump sum amount paid upon required delivery of required personnel, tools, equipment, materials, supplies, and incidentals to the Site and  $\frac{1}{2}$  of the lump sum amount upon removal of the same from the Site.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 01 22 03**  
**UNIT PRICES - DEMOLITION AND STRUCTURE MOVING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Demolition
    - a. Selective Site Demolition and Utilities Abandonment
      - (1) Select Demolition of Pavement and Driveways
      - (2) Select Demolition of House and Outbuildings
      - (3) Removal of Culvert Pipe
      - (4) General Removals
    - b. Pavement Removal
      - (1) Saw Cutting
      - (2) Asphalt and Concrete Pavement Removal
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  - 2. The method of measurement for payment.
  - 3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
  - 1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.

2. Project Management and Coordination
3. Photographic Documentation
4. Submittal Procedures
5. Quality Requirements
6. Temporary Facilities and Controls
7. Field Engineering
8. Equipment Installation
9. Cutting and Patching
10. Starting and Adjusting
11. Closeout Procedures
12. Operation and Maintenance Documentation
13. Project Record Documents
14. Demonstration and Training
15. Selective Site Demolition and Utilities Abandonment
16. Trenching and Backfill
17. Subsurface exploration for locating existing utilities
18. Pipe bedding
19. Connecting to existing system
20. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
21. If crossing or undermining of existing public or private utility, then include:
  - a. Maintaining the utility in service.
  - b. Replacing of existing utilities, if damaged.
  - c. Providing support and bedding material.
  - d. Trench maintenance.

## 1.03 DEMOLITION

### A. Selective Site Demolition

1. Selective Site Demolition including concrete surfaces, asphalt surfaces, and driveways required for underground utility installation shall be limited to the surfaces within the following trench width:
  - a. The width of the area not greater than the maximum trench width at the surface which is the greater of the pipe outside diameter plus 24" plus the distance from the surface to the top of the pipe embedment; or
  - b. If surface removal and replacement limits are shown on the Drawings outside the maximum trench width, then the actual width within the removal and replacement limits shown on the Drawings.
  - c. Pavement removal for other conditions shall be within the width limits shown on the Drawings or specified elsewhere.
2. Select Demolition of Pavement and Driveways
  - a. The unit price for Select Demolition of Pavement, Sidewalks and Driveways work includes:
    - (1) General Work Items of Article 1.02.
    - (2) Saw cutting at removal limits pavements, sidewalks and driveways.
    - (3) Breaking up and removal of pavement, sidewalks and driveways materials.
    - (4) Hauling and disposal of pavement, sidewalk and driveway materials.
  - b. Measurement for payment will be the length and width of material removed.
  - c. The unit of measurement for payment is square yards.
3. Select Demolition of House and Outbuildings
  - a. The unit price for Select Demolition of House and Outbuildings work includes:
    - (1) General Work Items of Article 1.02.
    - (2) Excavation

- (3) Breaking up and removal of house materials.
    - (4) Hauling and disposal of house materials.
    - (5) Backfilling and compacting.
  - b. Measurement for payment will not be made.
  - c. The unit of measurement for payment is lump sum.
- 4. Removal of Culvert Pipe
  - a. The unit price for Removal of Culvert Pipe work includes:
    - (1) General Work Items of Article 1.02.
    - (2) Excavation
    - (3) Salvaging and transporting culvert pipe.
    - (4) Hauling and disposal of culvert pipe materials.
    - (5) Backfilling and compacting.
  - b. Measurement for payment will be the actual length of the culvert pipe removed.
  - c. The unit of measurement for payment is linear feet.
- 5. General Removals
  - a. The unit price for General Removals work includes:
    - (1) General Work Items of Article 1.02.
    - (2) Items to be included in General Removals:
      - i) Railings
      - ii) Furnishings / Landscaping
      - iii) Flag Pole
      - iv) Patio Blocks
      - v) Bollards
      - vi) Lights Poles / Yard Lights

vii) Remove/Abandon Electrical Conduit, Conductors and Equipment per NEC

viii) Other Miscellaneous Items Designated on the Drawings

(3) Excavation

(4) Breaking up and removal of designated items

(5) Hauling and disposal of removed materials

(6) Backfilling and compacting

b. Measurement for payment will not be made.

c. The unit of measurement for payment is lump sum.

## B. Pavement Removal

### 1. Saw Cutting

a. The unit price for Saw Cutting work includes:

(1) General Work Items of Article 1.02

(2) Saw cutting concrete and asphalt pavement to specified depth.

b. Measurement for payment will be the actual length of saw cut.

c. The unit of measurement for payment is linear feet.

### 2. Asphalt and Concrete Pavement Removal

a. The unit price for Asphalt and Concrete Pavement Removal work includes:

(1) General Work Items of Article 1.02

(2) Breaking up and removal of asphalt and concrete materials.

(3) Hauling and disposal of asphalt and concrete materials.

(4) Protection of structure access castings.

(5) Providing and maintaining temporary ramping for vehicle access.

- b. Measurement for payment will be actual measured length and width of pavement removed.
- c. The unit of measurement for payment is square yards.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

**SECTION 01 22 04**  
**UNIT PRICES - EARTHWORK**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Clearing and Grubbing
  - 2. Clay Dam
  - 3. Excavation and Fill
    - a. Excavation
    - b. Fill Material – Ditches
    - c. Subgrade Preparation
      - (1) Excavation Below Subgrade (EBS)
      - (2) Roadway Patching Excavation
    - d. Trenching and Backfill
      - (1) Select Trench Backfill
      - (2) Pipe Foundation Stabilization
      - (3) Dig Downs
  - 4. Permanent Erosion and Sedimentation Controls
    - a. Permanent Erosion Mats
    - b. Geosynthetic Soil Reinforcement
      - (1) Geogrid Soil Reinforcement
      - (2) Geotextile Soil Reinforcement
  - 5. Riprap
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are

specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.

2. The method of measurement for payment.
3. The price per unit for payment.

## **1.02 GENERAL WORK ITEMS**

A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.

1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
2. Project Management and Coordination
3. Photographic Documentation
4. Submittal Procedures
5. Quality Requirements
6. Temporary Facilities and Controls
7. Field Engineering
8. Equipment Installation
9. Cutting and Patching
10. Starting and Adjusting
11. Closeout Procedures
12. Operation and Maintenance Documentation
13. Project Record Documents
14. Demonstration and Training
15. Selective Site Demolition and Utilities Abandonment
16. Trenching and Backfill
17. Subsurface Exploration for Locating Existing Utilities



18. Pipe Bedding
19. Connecting to Existing System
20. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
21. If crossing or undermining of existing public or private utility, then include:
  - a. Maintaining the utility in service.
  - b. Replacing of existing utilities, if damaged.
  - c. Providing support and bedding material.
  - d. Trench maintenance.

### **1.03 CLEARING AND GRUBBING**

- A. The unit price for Clearing and Grubbing work includes:
  1. General Work Items of Article 1.02.
  2. Preparation and protection.
  3. Cutting and disposing of trees, shrubs, brush, windfalls, logs and other vegetation.
  4. Removing and disposing of roots, stumps, stubs, logs and other timber.
- B. The estimated quantity will be the basis for payment.
- C. The unit of measurement for payment is each.

### **1.04 CLAY DAM**

- A. The unit price for Clay Dam work includes:
  1. General Work Items of Article 1.02.
  2. Excavating.
  3. Forming.
  4. Providing clay dam material as stated on the Unit Price Bid Schedule.
  5. Trenching and Backfilling.

6. Compacting.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

## **1.05 EXCAVATION AND FILL**

### **A. Excavation**

1. The unit price for Excavation work includes:
  - a. Removal of unsuitable materials.
  - b. Improvement of moisture content by compaction, disking, drying and recompaction.
  - c. Removal of topsoil to depth available.
  - d. Hauling of topsoil.
  - e. Stockpiling topsoil.
  - f. Reclaiming topsoil.
  - g. Excavation to finish subgrade.
  - h. Filling.
  - i. Grading.
  - j. Compaction.
  - k. Top soil placement/respreads.
2. Measurement for payment will not be made. The estimated quantity represents the computed volume by average end area from cross sections shown on the Drawings and will be the basis for payment.
3. The unit of measurement for payment is lump sum.

### **B. Fill Material – Ditches**

1. The unit price for Fill Material – Ditches work includes:
  - a. Removal of unsuitable materials.
  - b. Removal of topsoil to depth available.

- c. Hauling of topsoil.
  - d. Stockpiling topsoil.
  - e. Reclaiming topsoil.
  - f. Excavation to finish subgrade.
  - g. Filling.
  - h. Grading.
  - i. Compaction.
  - j. Top soil placement/respreads.
2. Measurement for payment will not be made. The estimated quantity represents the computed volume by average end area from cross sections shown on the Drawings and will be the basis for payment.
3. The unit of measurement for payment is lump sum.

C. Subgrade Preparation

1. Excavation Below Subgrade
- a. The unit price for Excavation Below Subgrade work includes:
    - (1) Excavation and removal of frost-heave material, unstable silty soils, water-bearing soil, topsoil, and other undesirable foundation material within the roadbed slope.
    - (2) Loading, hauling, and disposing of excavated material.
  - b. Measurement for payment will be the average length, width and depth of the cavity measured after the material is removed and before selected materials are placed.
  - c. The unit of measurement for payment is cubic yards.
2. Roadway Patching Excavation
- a. The unit price for Roadway Patching Excavation work includes:
    - (1) General Work Items of Article 1.02.
    - (2) Excavation and grading.
    - (3) Shaping and compacting.

- (4) Finish grading.
  - (5) Testing.
  - (6) Proof rolling.
  - (7) Providing drainage during construction.
- b. Measurement for payment will be the average length, width, and depth of cavity measured after the material is removed and be for selected materials are placed.
  - c. The unit of measurement for payment is cubic yards.
- D. Trenching and Backfill
1. Select Trench Backfill Material
    - a. The unit price for Select Trench Backfill Material work includes when ordered by the Engineer:
      - (1) General Work Items of Article 1.02.
      - (2) Backfilling and compacting the utility trench with select backfill.
      - (3) Granular backfill material.
    - b. Measurement for payment will be the volume calculated based on:
      - (1) The actual depth from 12" above the top of pipe to the top of the select backfill material 6 feet below surface.
      - (2) The bottom width is the pipe outside diameter plus 24".
      - (3) The top width is the actual top width of select backfill material not to exceed the width equivalent to the depth to 12" above the top of pipe.
      - (4) Where conditions require select backfill beyond the limits stated above and it is impractical to determine actual volume for additional material, quantities will be converted to equivalent in-place volume using two (2) tons per cubic yard of compacted in-place material. Contractor shall provide delivery tickets for each load showing weight measured on a certified scale, type of material, the date delivered and project name.
    - c. The unit of measurement for payment is cubic yards.

2. Pipe Foundation Stabilization

- a. The unit price for Pipe Foundation Stabilization work includes when ordered by the Engineer:
  - (1) General Work Items of Article 1.02.
  - (2) Excavation below the limits of the pipe bedding with the bottom of the excavation wider than the top with 1:1 side slopes.
  - (3) Dewatering.
  - (4) Soil Class A-7 aggregate material.
  - (5) Loading, hauling and disposing of surplus excavated material.
- b. Measurement for payment will be the volume calculated based on:
  - (1) The actual depth from 4" below the bottom of pipe to the bottom of the aggregate material placed.
  - (2) The bottom width is the actual width not to exceed the pipe outside diameter plus 24" plus 1:1 side slopes.
  - (3) The top width is the pipe outside diameter plus 24".
- c. The unit of measurement for payment is cubic yards.

3. Dig Downs

- a. The unit price for Dig Downs work includes:
  - (1) General Work Items of Article 1.02.
  - (2) Digging down to expose facility.
  - (3) Recording elevation of top of facility and providing that information to the Engineer.
  - (4) Backfilling and compacting excavation.
- b. Measurement for payment will be the actual number completed.
- c. The unit of measurement for payment is each.
- d. Payment will not be made if dig downs are completed while constructing the utility pipe.

## 1.06 PERMANENT EROSION AND SEDIMENTATION CONTROL

### A. Permanent Erosion Mats

1. The unit price for Permanent Erosion Mats work includes:
  - a. General Work Items of Article 1.02.
  - b. Providing in accordance with manufacturer's recommendations.
  - c. Provide non-channel erosion mat in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1052 "Non-Channel Erosion Mat".
  - d. Provide channel erosion mat in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1053 "Channel Erosion Mat".
2. Measurement for payment will be the actual measured length and width of the material installed complete.
3. The unit of measurement for payment is square yards.

### B. Geosynthetic Soil Reinforcement

1. Geogrid Soil Reinforcement
  - a. The unit price for Geogrid Soil Reinforcement work includes:
    - (1) Surface preparation.
    - (2) Placing geogrid.
    - (3) Providing backfill.
    - (4) Making repairs to geogrid.
  - b. Measurement for payment will be actual measured length and width of area.
  - c. The unit of measurement for payment is square yards.
2. Geotextile Soil Reinforcement
  - a. The unit price for Geotextile Soil Reinforcement work includes:
    - (1) Surface preparation.
    - (2) Laying geotextile material.

- (3) Making repairs to the geotextile material.
  - (4) Providing fill material.
  - (5) Compaction.
  - (6) Sewing of seams.
  - (7) Protection of geotextile material.
- b. Measurement for payment will be actual measured length and width of area.
  - c. The unit of measurement for payment is square yards.

#### **1.07 RIPRAP**

- A. The unit price for Riprap work includes:
  1. Preparation.
  2. Placing geotextile fabric.
  3. Placing riprap stones.
  4. Grouting riprap, if required.
- B. Measurement for payment will be actual length and width of area.
- C. The unit of measurement for payment is square yards.

#### **PART 2 - PRODUCTS (Not Used)**

#### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

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**SECTION 01 22 05**  
**UNIT PRICES – EXTERIOR IMPROVEMENTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Aggregate Base Courses
    - a. Breaker Stone Subbase Course
    - b. Crushed Aggregate Base and Surface Course
  - 2. Flexible Paving
    - a. Hot Mix Asphalt Pavement
    - b. Portland Cement Concrete Driveways
  - 3. Paving Specialties
    - a. Pavement Markings
      - (1) Pavement Marking – Words and Symbols
  - 4. Fences and Gates
    - a. Chainlink Fences and Gates
  - 5. Turf and Grasses
    - a. Topsoil, Turf and Grasses
  - 6. Concrete Block Retaining Wall
  - 7. Concrete Base – Retaining Wall
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  - 2. The method of measurement for payment.

3. The price per unit for payment.

## **1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
  1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
  2. Project Management and Coordination
  3. Photographic Documentation
  4. Submittal Procedures
  5. Quality Requirements
  6. Temporary Facilities and Controls
  7. Field Engineering
  8. Cutting and Patching
  9. Closeout Procedures
  10. Project Record Documents
  11. Selective Site Demolition and Utilities Abandonment
  12. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.

## **1.03 BASE COURSES**

- A. Breaker Stone Subbase Course
  1. The unit price for Breaker Stone Subbase Course work includes:
    - a. General Work Items of Article 1.02.
    - b. Aggregate material.
    - c. Preparation of foundation.
    - d. Placing and compacting to thickness and width shown on the Drawings or specified elsewhere.

- e. Maintenance until surface base course is constructed.
2. Measurement for payment will be the actual amount of material required and incorporated in the work using planned depth or measured depth, if no depth is indicated, and the actual measured length and width of material placed within the limits shown on the Drawings.
- a. Where conditions make it impractical to determine actual volume for additional material, quantities will be converted to equivalent in-place volume using two (2) tons per cubic yard of compacted in-place material. Contractor shall provide delivery tickets for each load showing weight measured on a certified scale, type of material, the date delivered and project name.
3. The unit of measurement for payment is cubic yards.
- B. Crushed Aggregate Base
1. The unit price for Crushed Aggregate Base Course work includes:
- a. General Work Items of Article 1.02.
  - b. Aggregate material.
  - c. Preparation of foundation.
  - d. Placing and compacting to thickness and width shown on the Drawings or specified elsewhere.
  - e. Maintenance until surface pavement is constructed.
  - f. Preparation of the crushed aggregate base for paving.
  - g. Proof (test) rolling.
  - h. Adjustment of manholes and valve boxes to proposed finished road grade.
2. Measurement for payment will be the actual amount of material required and incorporated in the work using planned depth or measured depth, if no depth is indicated, and the actual measured length and width of material placed within the limits shown on the Drawings.
- a. Where conditions make it impractical to determine actual volume for additional material, quantities will be converted to equivalent in-place volume using two (2) tons per cubic yard of compacted in-place material. Contractor shall provide delivery tickets for each load showing weight measured on a certified scale, type of material, the date delivered and project name.

3. The unit of measurement for payment is cubic yards

#### **1.04 FLEXIBLE PAVING**

##### **A. Hot Mix Asphalt Pavement**

1. The unit price for Hot Mix Asphalt Pavement work includes:
  - a. General Work Items of Article 1.02.
  - b. Hot Mix Asphalt mixture, tack coat and other required materials.
  - c. Surface preparation.
  - d. Provide tack coat on base material.
  - e. Saw cutting adjacent and abutting pavement surfaces.
  - f. Hot Mix Asphalt placement and compaction to thickness and width shown on the Drawings or specified elsewhere.
  - g. Tack coat between asphaltic concrete courses and abutting pavements.
2. Measurement for payment will be the actual amount of material required and incorporated in the work using the measured length, width, and specified depth of material placed within the limits shown on the Drawings.
3. The unit of measurement for payment is square yards.

##### **B. Concrete Driveways**

1. The unit price for Concrete Sidewalks and Driveways work includes:
  - a. General Work Items of Article 1.02.
  - b. Providing Portland cement concrete mixture of thickness shown in the drawings or specified elsewhere.
  - c. Providing reinforcement.
  - d. Providing expansion joint.
  - e. Providing curing.
  - f. Subgrade preparation.
  - g. Providing contraction joints.

- h. Saw cutting adjacent surfaces.
  - i. Finishing.
  - j. Protection.
  - k. Restoration.
- 2. Measurement for payment will be the average horizontal length and width of the concrete placed.
  - 3. The unit of measurement for payment is square feet.

## **1.05 PAVEMENT SPECIALTIES**

### **A. Pavement Markings**

- 1. Pavement Marking – Words and Symbols
  - a. The unit price for Pavement Marking - Words and Symbols includes:
    - (1) General Work Items of Article 1.02.
    - (2) Provide ready-mixed traffic paints of the color specified in the plan.
    - (3) Protection of the installed paint until dry.
    - (4) Provide and install glass beads.
  - b. Measurement for payment will be the actual number of words or symbols installed and accepted.
  - c. The unit of measurement for payment will be each.

## **1.06 FENCES AND GATES**

### **A. Chainlink Fences and Gates**

- 1. The unit price for Chain Link Fences and Gates work includes:
  - a. General Work Items of Article 1.02.
  - b. Provide corner, pull, end, line and gate posts.
  - c. Provide framing.
  - d. Provide fabric and tension wire.

- e. Provide gates.
  - f. Provide adjusting and finishing.
  - 2. Measurement for payment will be the actual length measured in the field.
  - 3. The unit of measurement for payment is linear feet.
- B. Plastic Privacy Fences and Gates
- 1. The unit price for Plastic Privacy Fences and Gates work includes:
    - a. General Work Items of Article 1.02.
    - b. Provide corner and gate posts.
    - c. Provide framing.
    - d. Provide gates.
    - e. Provide adjusting and finishing.
  - 2. Measurement for payment will be the actual length measured in the field.
  - 3. The unit of measurement for payment is linear feet.

## **1.07 TURF AND GRASSES**

- A. Topsoil, Turf and Grasses
- 1. The unit price for Topsoil, Turf and Grasses work includes:
    - a. General Work Items of Article 1.02.
    - b. Site preparation.
    - c. Topsoiling
    - d. Seeding.
    - e. Fertilizing.
    - f. Mulching
    - g. Maintenance and monitoring.
  - 2. Measurement for payment will be the actual length and width, not to exceed width shown on Drawings, measured in the field.
  - 3. The unit of measurement for payment is lump sum.

## **1.08 CONCRETE BLOCK RETAINING WALL**

### **A. Concrete Block Retaining Wall**

1. The unit price for Concrete Block Retaining Wall work includes:
  - a. General Work Items of Article 1.02.
  - b. Site Excavation and preparation.
  - c. Soil Class A-7 aggregate material.
  - d. Prepare foundation.
  - e. Perforated underdrain piping with filter sock.
  - f. Constructing Concrete Base, as shown on Detail Drawings.
  - g. Placing concrete block wall and foundation materials, as shown on the Drawings.
  - h. Steel reinforcement.
  - i. Backfill and compaction.
  - j. Grading behind the wall.
2. Measurement for payment will be the actual measured length and width of material placed within the limits shown on the Drawings taken from the front face of the wall, including the buried section.
3. The unit of measurement for payment is square feet.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

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**SECTION 01 22 08**  
**UNIT PRICES – WATER UTILITY TRANSMISSION AND DISTRIBUTION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Water Service Pipe and Tubing
  - 2. Water Service Lowering
  - 3. Hydrant
  - 4. Connections to Existing Water Mains
  - 5. Valves
  
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  - 2. The method of measurement for payment.
  - 3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
  - 1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
  - 2. Project Management and Coordination
  - 3. Photographic Documentation
  - 4. Submittal Procedures
  - 5. Quality Requirements

6. Temporary Facilities and Controls
7. Hydrostatic Testing of Pressure Pipelines
8. Field Engineering
9. Equipment Installation
10. Cutting and Patching
11. Starting and Adjusting
12. Closeout Procedures
13. Operation and Maintenance Documentation
14. Project Record Documents
15. Demonstration and Training
16. Selective Site Demolition and Utilities Abandonment
17. Clearing and Grubbing
18. Trenching and Backfill
19. Dewatering
20. Erosion and Sedimentation Controls
21. Subsurface Exploration for Locating Existing Utilities
22. Pipe Bedding
23. Connecting to Existing System
24. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
25. If crossing or undermining of existing public or private utility, then include:
  - a. Maintaining the utility in service.
  - b. Replacing of existing utilities, if damaged.
  - c. Providing support and bedding material.
  - d. Trench maintenance.

### **1.03 WATER SERVICE PIPE AND TUBING**

- A. The unit price for Water Service Pipe and Tubing work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Pipe material as stated in the Unit Price Bid Schedule and installed using the open trench method or installed through steel casing.
  - 3. Connections to corporation and curb valves.
  - 4. Flushing and disinfection.
  - 5. Bacteriological sampling and testing at certified laboratory.
- B. Measurement for payment will be the actual horizontal length along the centerline of the installed pipe/tubing from valve to valve and valve to end of pipe/tubing.
- C. The unit of measurement for payment is linear feet.

### **1.04 WATER SERVICE LOWERING**

- A. The unit price for Water Service Lowering work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Pipe material as stated in the Unit Price Bid Schedule and installed using the open trench method from corporation to curb stop.
  - 3. Connections to corporation and curb stops.
  - 4. Flushing and disinfection.
- B. Measurement for payment will be the actual horizontal length along the centerline of the installed pipe/tubing from corporation to valve.
- C. The unit of measurement for payment is linear feet.

### **1.05 HYDRANT**

- A. The unit price for Hydrant work includes:
  - 1. General Work Items of Article 1.02.
    - a. Hydrant complete of the specified bury depth.
    - b. Joint restraints.
    - c. Hydrant wrenches.

- d. Polyethylene encasement.
  - e. Adjustment of nozzles to correct direction.
  - f. Drainage pit.
  - g. Flushing and disinfection.
  - h. Bacteriological sampling and testing at certified laboratory.
- 2. Measurement for payment will be the actual number installed.
  - 3. The unit of measurement for payment is each.

### **1.06 CONNECTIONS TO EXISTING WATER MAINS**

- A. The unit price for Connections to Existing Water Mains work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Locating existing water main.
  - 3. Connection by tapped fitting to existing water main work includes:
    - a. Tapping sleeve or cross.
    - b. Tapping of existing water main.
    - c. Connection to end of existing pipe.
    - d. Remove existing plug.
    - e. Direct connection to end of existing pipe.
    - f. Transition fittings, if required.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

## **1.07 VALVES**

- A. The unit price for Valves work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Valve.
  - 3. Valve box suitable for the minimum pipe bury depth stated on the drawings for water main.
  - 4. Valve wrenches/keys.
  - 5. Bedding material.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

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**SECTION 01 22 09**  
**UNIT PRICES – SANITARY SEWERAGE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Sanitary Sewer Service Branches
  - 2. Sanitary Sewer Service Laterals
  - 3. Sanitary Sewer Service Cleanouts
  
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  - 2. The method of measurement for payment.
  - 3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
  - 1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
  - 2. Project Management and Coordination
  - 3. Photographic Documentation
  - 4. Submittal Procedures
  - 5. Quality Requirements
  - 6. Temporary Facilities and Controls
  - 7. Temporary Wastewater Bypass Pumping

8. Field Engineering
9. Equipment Installation
10. Cutting and Patching
11. Starting and Adjusting
12. Closeout Procedures
13. Operation and Maintenance Documentation
14. Project Record Documents
15. Demonstration and Training
16. Selective Site Demolition and Utilities Abandonment
17. Trenching and Backfill
18. Dewatering
19. Erosion and Sedimentation Controls
20. Testing Utility Pipelines
21. Subsurface exploration for locating existing utilities
22. Pipe bedding
23. Connecting to existing system
24. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
25. If crossing or undermining of existing public or private utility, then include:
  - a. Maintaining the utility in service.
  - b. Replacing of existing utilities, if damaged.
  - c. Providing support and bedding material.
  - d. Trench maintenance.



### **1.03 SANITARY SEWER SERVICE BRANCHES**

- A. The unit price for Sanitary Sewer Service Branches work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Sanitary sewer service branches of same material strength or better than sanitary sewer main pipe.
  - 3. Installation along with the sanitary sewer main pipe installation.
  - 4. Adaptors to accommodate sanitary sewer service pipe connection.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

### **1.04 SANITARY SEWER SERVICE LATERALS**

- A. The unit price for Sanitary Sewer Service Laterals work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Sanitary sewer service lateral pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method or installed through steel casing.
  - 3. Watertight plug in the end of the sewer service lateral or connection, including transition coupling, to the existing building sewer.
  - 4. Cleanouts as required by the state plumbing requirements, if a separate unit price item is not provided.
  - 5. Tracer wire or other required pipe detection system on non-metallic piping.
  - 6. Excavation, breakdown and removal of abandoned piping inside the trench area.
- B. Measurement for payment will be the actual horizontal length along the centerline of the installed sewer service lateral pipe (excluding risers) from centerline of the service branch to the end of the pipe at the right-of-way line or easement with no deductions for fittings.
- C. The unit of measurement for payment is linear feet.

## **1.05 SANITARY SEWER SERVICE CLEANOUTS**

- A. The unit price for Sanitary Sewer Service Cleanout work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Sanitary sewer service cleanout and wye fitting of same material strength or better than the sanitary sewer service lateral pipe.
  - 3. A frost sleeve with a watertight cover.
  - 4. Concrete slab around top of cleanout when located in a paved or gravel surface.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

**SECTION 01 22 10**  
**UNIT PRICES – STORMWATER UTILITIES**

**1.01 GENERAL SUMMARY**

A. Section Includes

1. Storm Sewer
2. Storm Sewer Service Branches
3. Storm Sewer Service Laterals
4. Culvert Pipe
  - a. Culvert Pipe
  - b. Corrugated Metal Pipe (CMP) Tees, Bends, and Risers
5. Standard, Large Diameter and Rectangular Storm Manholes
6. Type "S" Manholes
7. Inlets and Catch Basins
8. Apron Endwall
9. Tracer Wire Signal Connection Box

B. Unit Prices include:

1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
2. The method of measurement for payment.
3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.

1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
2. Project Management and Coordination
3. Photographic Documentation
4. Submittal Procedures
5. Quality Requirements
6. Temporary Facilities and Controls
7. Field Engineering
8. Equipment Installation
9. Cutting and Patching
10. Starting and Adjusting
11. Closeout Procedures
12. Operation and Maintenance Documentation
13. Project Record Documents
14. Demonstration and Training
15. Selective Site Demolition and Utilities Abandonment
16. Trenching and Backfill
17. Subsurface exploration for locating existing utilities
18. Pipe bedding
19. Connecting to existing system
20. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
21. If crossing or undermining of existing public or private utility, then include:
  - a. Maintaining the utility in service.
  - b. Replacing of existing utilities, if damaged.

- c. Providing support and bedding material.
- d. Trench maintenance.

### **1.03 STORM SEWER**

- A. The unit price for Storm Sewer work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Storm sewer pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method.
- B. Measurement for payment will be the actual horizontal length along the centerline of the installed sewer pipe from centerline of manhole/inlet/catch basin to centerline of manhole/inlet/catch basin with no deductions for manholes/inlets/catch basins or to the end of the installed pipe if not connected to manholes/inlets/catch basins. Flared end sections, endwalls and spillways will not be included in the measurement for payment.
- C. The unit of measurement for payment is linear feet.

### **1.04 STORM SEWER SERVICE BRANCHES**

- A. The unit price for Storm Sewer Service Branches work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Storm sewer service branches of same material strength or better than storm sewer main pipe.
  - 3. Installation along with the storm sewer main pipe installation.
  - 4. Adaptors to accommodate storm sewer service pipe connection.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

### **1.05 STORM SEWER SERVICE LATERALS**

- A. The unit price for Storm Sewer Service Laterals work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Storm sewer service lateral pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method or installed through steel casing.

3. Watertight plug in the end of the sewer service lateral.
- B. Measurement for payment will be the actual horizontal length along the centerline of the installed sewer service lateral pipe from centerline of the service branch to the end of the pipe at the right-of-way line or easement with no deductions for fittings.
- C. The unit of measurement for payment is linear feet.

## **1.06 CULVERT PIPE**

- A. Culvert Pipe
1. The unit price for Culvert Pipe work includes:
    - a. General Work Items of Article 1.02.
    - b. Culvert pipe of material stated in the Unit Price Bid Schedule and installed using the open trench method.
    - c. Fill over culvert pipes.
  2. Measurement for payment will be the actual horizontal length along the centerline of the installed culvert pipe. Flared end sections, headwalls, endwalls and spillways will not be included in the measurement for payment.
  3. The unit of measurement for payment is linear feet.
- B. Corrugated Metal Pipe (CMP) Tees, Bends, and Risers
1. The unit price for Corrugated Metal Pipe Tees, Bends, and Risers work includes:
    - a. General Work Items of Article 1.02.
    - b. Culvert CMP tees, bends, and risers with metal drop in grates stated in the Unit Price Bid Schedule and installed using the open trench method.
    - c. Fill over CMP tees, bends, and risers.
  2. Measurement for payment will be the actual number installed.
  3. The unit of measurement for payment is each.

## **1.07 STANDARD, LARGE DIAMETER AND RECTANGULAR STORM MANHOLES**

- A. The unit price for Standard, Large Diameter and Rectangular Storm Manholes work includes:
1. General Work Items of Article 1.02.
  2. Precast reinforced concrete components or concrete masonry, if approved.
  3. Joint flexible gasket material.
  4. Grout seal between the manhole structure and the sewer pipe.
  5. Adjusting rings and bituminous plastic cement sealant at chimney.
  6. Manhole steps (where required).
  7. Manhole frame and cover.
  8. Bedding material.
  9. Sewer pipe stub with watertight plug (where required).
- B. Measurement for payment will be the distance from the invert of the lowest sewer to the top of the frame and cover as set.
- C. The unit of measurement for payment is vertical feet.

## **1.08 TYPE "S" MANHOLES**

- A. The unit price for Type "S" Manholes work includes:
1. General Work Items of Article 1.02.
  2. Precast reinforced concrete components.
  3. Joint flexible gasket material.
  4. Grout seal between the manhole structure and the sewer pipe.
  5. Adjusting rings and bituminous plastic cement sealant at chimney.
  6. Manhole steps (where required).
  7. Manhole frame and cover.
  8. Bedding material.
  9. Sewer pipe stub watertight plug (where required).

10. Sand fill and Class “B” concrete floor and flow line.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

#### **1.09 INLETS AND CATCH BASINS**

- A. The unit price for Inlets and Catch Basins work includes:
1. General Work Items of Article 1.02.
  2. Precast reinforced concrete components.
  3. Joint flexible gasket material.
  4. Grout seal between the inlet/catch basin structure and the sewer pipe.
  5. Adjusting rings grouted in place.
  6. Casting frame and grate.
  7. Bedding material.
  8. Sewer pipe stub watertight plug (where required).
  9. Sand fill and Class “B” concrete floor and flow line.
  10. Temporary cover over inlet/catch basin to prevent eroded materials from entering.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

#### **1.10 APRON ENDWALL**

- A. The unit price for Apron Endwall work includes:
1. General Work Items of Article 1.02.
  2. Precast concrete components.
  3. Anchors to storm sewer pipe.
  4. Pipe grates when specified.



- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

**1.11 TRACER WIRE SIGNAL CONNECTION BOX**

- A. The unit price for Tracer Wire Signal Connection Box work includes:
  - 1. General Work Items of Article 1.02.
  - 2. Tracer Wire.
  - 3. Providing and installing tracer wire signal connection box.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

**PART 2 - MATERIALS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

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**SECTION 01 22 26**  
**UNIT PRICES – ELECTRICAL**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Electrical Wiring and Components
    - a. Conduit
- B. Unit Prices include:
  - 1. Defined work for each Unit Price Item that will provide a functionally complete Project when combined with all Unit Price Items. If there are specific work items that the Contractor believes not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
  - 2. The method of measurement for payment.
  - 3. The price per unit for payment.

**1.02 GENERAL WORK ITEMS**

- A. Include with the appropriate Unit Price Item the following work items common to the Unit Price Items unless there is a specific Unit Price Item for the Work, then include with that specific Unit Price Item.
  - 1. Mobilization of personnel, equipment, supplies, and incidentals required to complete the Work.
  - 2. Project Management and Coordination
  - 3. Photographic Documentation
  - 4. Submittal Procedures
  - 5. Quality Requirements
  - 6. Temporary Facilities and Controls
  - 7. Field Engineering
  - 8. Permits

9. Closeout Procedures
10. Project Record Documents
11. Selective Site Demolition and Utilities Abandonment
12. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.

### **1.03 ELECTRICAL WIRING AND COMPONENTS**

#### **A. Conduit**

1. The unit price for Conduit work includes:
  - a. General work items of Article 1.02.
  - b. Trenching and backfilling
  - c. Furnishing and installing materials as specified
  - d. Furnishing and installing connectors and couplings
  - e. Connections to existing electrical components
  - f. Terminations with all necessary materials.
2. Measurement for payment will be the actual measured length of conduit installed.
3. The unit of measurement for payment is linear feet.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

**SECTION 01 29 00  
PAYMENT PROCEDURES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Administrative and procedural requirements to prepare and process Applications for Payment.

**1.02 SCHEDULE OF VALUES**

- A. Unit Price Bid Schedule shall be the Schedule of Values used as the basis for reviewing Applications for Payment.

**1.03 APPLICATIONS FOR PAYMENT**

- A. Provide each Application for Payment consistent with previous applications and payments as recommended by the Engineer and approved by Owner.
- B. Submittal times for progress payments shall be as determined at the Preconstruction Conference. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 10 days before the date for each progress payment.
- C. Requests for progress payments shall be at least 10 days before the date established for each progress payment, but not more often than once a month.
- D. Use forms provided by Engineer for applications for payment. Sample copy of the Application for Payment and Continuation Sheet is included in Section 00 62 76 Application for Payment Form.
- E. Application Preparation Procedures
  - 1. Unit Price Contract Work
    - a. When requested by the Contractor, the Engineer will determine the actual quantities and classifications of Unit Price Work performed.
    - b. Engineer will review preliminary determinations with the Contractor before completing Application for Payment.
    - c. Engineer will complete the Application for Payment based on Engineer's decision on actual quantities and classifications.

- d. Engineer will submit three (3) original copies of Application for Payment to Contractor for certification of all three (3) original copies.
  - e. Contractor shall submit signed Application for payment to Owner, through Engineer, for approval within time frame agreed to at the Preconstruction Conference.
- F. With each Application for Payment, submit waivers of liens from subcontractors and suppliers for the construction period covered by the previous application.
  - 1. Submit partial waivers on each item for amount requested before deduction for retainage on each item.
  - 2. When an application shows completion for an item, submit final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work shall submit waivers.
  - 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application.
  - 5. Submit waivers of lien on forms executed in a manner acceptable to Owner.
- G. The following administrative actions and submittals shall precede or coincide with submittal of first Application for Payment:
  - 1. List of subcontractors.
  - 2. Schedule of Values.
  - 3. Contractor's construction schedule.
  - 4. Copies of building and other permits.
  - 5. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
- H. Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum.
4. Consent of Surety to Final Payment.
5. Final lien waivers as evidence of settled claims.
6. Final liquidated damages settlement statement.

**PART 2 - MATERIALS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**

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**SECTION 01 31 00**  
**PROJECT MANAGEMENT AND COORDINATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Project Coordination
  - 2. Preconstruction Meetings
  - 3. Progress Meetings
  - 4. Electronic Communication Protocols
  - 5. Preconstruction Private Easement Meeting

**1.02 PROJECT COORDINATION**

- A. Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
- B. Coordinate construction operations that depend on each other for proper installation, connection, and operation.
- C. Coordinate scheduling and timing of required administrative procedures with construction activities and activities of other contractors (where applicable) to avoid conflicts and to ensure orderly progress of the Work.
- D. Coordinate the Work according to the requirements of the General Conditions. Do not delegate responsibility for coordination to any subcontractor.
  - 1. Anticipate the interrelationship of all subcontractors and their relationship with the total Work.
  - 2. Resolve differences or disputes between subcontractors and material suppliers concerning coordination, interference, or extent of work between Specification Sections.
    - a. The Contractor's decisions, if consistent with the Contract Documents, shall be final.
    - b. Engineer will not coordinate work between Specification Sections.
  - 3. Coordinate the work of subcontractors and material suppliers, so that their work is performed in a manner to minimize interference with, and to facilitate the progress of the work.

- E. Coordinate utility and building services shutdowns, interruptions and closures of vehicular and pedestrian thoroughfares, including access to buildings and parking areas, to minimize disruption of private and site activities.
- F. Provide layout, scheduling and sequencing of the Work.
  - 1. Verify, confirm and coordinate field measurements so that new construction correctly and accurately interfaces with conditions existing prior to construction.
  - 2. Bring together the various parts, components, systems and assemblies as required for the correct interfacing and integration of all elements of the Work.
  - 3. Coordinate Work to correctly and accurately connect abutting, adjoining, overlapping and related elements, including work under separate contracts.

### **1.03 PRECONSTRUCTION MEETINGS**

- A. Engineer will schedule and facilitate a preconstruction conference within 20 days after the Contract Times start to run and before Work at the site starts.
- B. Authorized representatives of the Owner, Engineer, Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to make binding decisions of matters relating to the Work.
- C. The purpose of the Preconstruction Conference is to:
  - 1. Establish a working understanding among the parties as to the Work.
  - 2. Discuss the following preliminary schedules prepared by the Contractor.
    - a. Progress schedule.
    - b. Shop drawing and sample submittals.
    - c. Schedule of values for all of the Work.
  - 3. Processing Applications for Payment.
  - 4. Maintaining required records.
  - 5. Other Project requirements.

### **1.04 PROGRESS MEETINGS**

- A. The Engineer will schedule and facilitate progress meetings at the Project site at regular intervals.

- B. In addition to representatives of the Owner, the Engineer and the Contractor, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to make binding decisions on matters relating to the Work.
- C. Items of significance will be reviewed that could affect progress.
  - 1. Review progress since the last meeting.
    - a. Determine where each activity is in relation to the Contractor's construction schedule, whether on time or ahead or behind schedule.
    - b. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
    - c. Discuss whether scheduled revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
  - 2. Review the present and future needs of each entity present, including the following:
    - a. Interface requirements.
    - b. Time.
    - c. Sequences.
    - d. Status of submittals.
    - e. Deliveries.
    - f. Off-site fabrication problems.
    - g. Access.
    - h. Site utilization.
    - i. Temporary facilities and services.
    - j. Hours of work.
    - k. Hazards and risks.
    - l. Housekeeping.

- m. Quality and work standards.
  - n. Change orders.
  - o. Documentation of information for payment requests.
- D. Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule within 5 days after each meeting.

#### **1.05 ELECTRONIC COMMUNICATION PROTOCOLS**

- A. The Engineer will use electronic means of communication related to the Contractor's correspondence, Submittals, Requests for Information (RFI), Progress Payment Requests, and Non-Compliance Issues via Internet-based software.
- B. The Contractor shall use this electronic communication for administrative communications with the Engineer.
- C. The Contractor shall be responsible for frequent monitoring of the electronic means from the Engineer.
- D. The use of the electronic means of communication does not waive the requirement for the provision of hard copies of all formal correspondence, submittals and RFIs. All hard copies of documents shall match the electronic copies.
- E. In order to process formal correspondence and other required documentation, the Contractor shall have in place the required basic components outlined as follows:
  - 1. Use computer hardware that meets the requirements of the electronic means of communication.
  - 2. Software to be compatible with the Engineer's standards.
- F. Contractor shall be responsible for providing all computers, printers, plotters, scanners or other hardware and software for the Contractor's use.
- G. Provide all networking equipment and associated cabling within the Contractor's office.

#### **1.06 PRECONSTRUCTION PRIVATE EASEMENT MEETING**

- A. Advise the Engineer when ready for preconstruction easement meetings. Engineer will schedule preconstruction private easement meetings with each easement grantor prior to construction on the easement.

- B. Authorized representatives of the property owner, Owner, Engineer, and Contractor and its superintendent, and other concerned parties shall attend the meeting. All participants at the meeting shall be familiar with the Project and authorized to make binding decisions of matters relating to the Work.
- C. The purpose of the Preconstruction Private Easement Meeting is to:
  - 1. Establish a working understanding among the parties as to the Work within private easements and easement requirements.
  - 2. Establish the construction procedures that will minimize damage within the easement.
  - 3. Identify and agree to items such as structures, trees, shrubbery, walls, and other obstructions that will be removed and replaced.
  - 4. Define and agree to the level of final restoration on the easement property.
  - 5. Establish when the Work within the easement is scheduled.
- D. Engineer will record the significant discussions and agreements and distribute to all participants.
- E. Do not proceed with installation within an easement until the Preconstruction Private Easement Meeting is successfully completed and agreements obtained.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 01 32 33**  
**PHOTOGRAPHIC DOCUMENTATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes:
1. Preconstruction photographs.

**1.02 SUBMITTALS**

- A. Informational Submittals
1. Submit photographs and video recordings to Engineer prior to start of construction.
  2. Digital Photographs. Submit image files within three (3) days of taking photographs.
    - a. Photographs shall be digital format, color photos with a minimum resolution of 2048 x 1536 pixels (requiring a minimum camera resolution of 3.1 megapixels).
    - b. Submit photos as unaltered digital files with same aspect ratio as the camera sensor, uncropped, date and time stamped in folder named by date of photograph.
    - c. Image file names shall include information specific to location, such as street name, street number, and compass direction of vantage point.
    - d. Provide the following information with each image description in file metadata tag:
      - (1) Name of Project.
      - (2) Name and contact information for photographer.
      - (3) Name of Engineer.
      - (4) Name of Contractor.
      - (5) Date photograph taken.
      - (6) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction, if building.

- (7) Unique sequential identifier keyed to accompanying key plan.

### **1.03 QUALITY ASSURANCE**

- A. Photographer shall be an individual who has performed photographs of construction projects for not less than three years.

### **1.04 USAGE RIGHTS**

- A. Obtain and transfer copyright usage rights to Owner and Engineer for unlimited reproduction of photographic documentation.

## **PART 2 - PRODUCTS**

### **2.01 PHOTOGRAPHIC MEDIA**

- A. Provide digital images in JPG or TIF format on a data USB Flash Drive.
  - 1. Images shall be contained in separate folders for each day photos taken.
  - 2. If required by the Engineer, provide additional folders to differentiate between project phases or physical areas of construction activity.

## **PART 3 - EXECUTION**

### **3.01 CONSTRUCTION PHOTOGRAPHS**

- A. Photographer shall have experience in taking construction photographs.
- B. General
  - 1. Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work.
  - 2. Photographs with blurry or out-of-focus areas are not acceptable.
  - 3. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Include date and time in file name for each image.
  - 2. Maintain one set of images accessible in the field office at Project site, available at all times for reference.



D. Preconstruction Photographs

1. Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Engineer.
2. Flag construction limits or excavation areas before taking construction photographs.
3. Take sufficient number of photographs to show existing conditions adjacent to property before starting the Work.
4. Take sufficient number of photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
5. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

**END OF SECTION**

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**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Types of Submittals
  - 2. Submittal Procedures
  - 3. Submittal of Schedules
  - 4. Action Submittal Procedures
  - 5. Informational Submittal Procedures
  - 6. Transmittal of Submittals

**1.02 TYPES OF SUBMITTALS**

- A. General
  - 1. Submittals are categorized by the type of action or by sequence of construction.
  - 2. The following identifies the types of submittal designated in the respective Specification Sections.
  - 3. Schedules and Action Submittals require action by the Engineer.
  - 4. Informational Submittals do not require action by the Engineer other than to determine if complete, sufficient and results meet specified requirements.
- B. Schedules include:
  - 1. Progress Schedule
  - 2. Schedule of Submittals
  - 3. Schedule of Values
- C. Action Submittals include:
  - 1. Product Data

2. Shop Drawings
  3. Samples
  4. Delegated Design Submittals
    - a. Delegated design submittals, which include documents prepared, sealed, and signed by a design professional properly licensed in the jurisdiction of the Project and retained by Contractor, Subcontractor, or Supplier for materials and equipment incorporated into the completed Work.
    - b. Delegated design submittals do not include submittals related to temporary construction unless specified otherwise in the related Specification Section.
    - c. Delegated design submittals include: design drawings, design data including calculations, specifications, certifications, and other submittals prepared by such design professional.
- D. Informational Submittals
1. Certificates.
  2. Test and Evaluation Reports
  3. Manufacturers' Instructions
  4. Source Quality Control Submittals
  5. Field or Site Quality Control Submittals
  6. Manufacturer Reports
  7. Sustainable Design Submittals
  8. Special Procedure Submittals
  9. Qualification Statements
  10. Design data not sealed and signed by a design professional retained by Contractor, Subcontractor, or Supplier.
  11. Preconstruction Photo Documentation
  12. Pre-construction test and evaluation reports, such as reports on pilot testing, subsurface investigations, potential Hazardous Environmental Condition, and similar reports.

13. Manufacturer/Supplier instructions, including installation data, and instructions for handling, starting-up, and troubleshooting.
14. Closeout Submittals
15. Maintenance Material Submittals

### **1.03 SUBMITTAL OF SCHEDULES**

#### **A. General**

1. Prepare and submit for Engineer's review preliminary Progress Schedule, Schedule of Submittals and Schedule of Values (lump sum contracts) within 10 days after the Effective Date of the Agreement and prior to the Preconstruction Conference.
2. At least 10 days before submission of the first Application for Payment, attend a conference with the Engineer to review acceptability of the submitted preliminary schedules. If Contractor submits schedules to Engineer for review 10 days before the Preconstruction Conference, then the schedule review conference will occur at the Preconstruction Conference.
3. Within 10 days after the conference for determining acceptability of schedules, make corrections and adjustments, complete and resubmit schedules to Engineer to determine acceptability.
4. Provide three (3) copies of schedules for each submission to Engineer.

#### **B. Contractor's Progress Schedule**

1. Progress Schedule period starts at Notice to Proceed and ends at Substantial Completion.
2. Provide sufficient detail of the work activities comprising the schedule to assure adequate planning and execution of the work, such that in the judgement of the Engineer, it provides an appropriate basis for monitoring and evaluation of the progress of the Work. A work activity is defined as an activity which requires substantial time and resources (manpower, equipment and/or material) to complete and is required to be performed before the contract is considered complete.
3. The schedule shall indicate the sequence of work activities. Identify each activity with a description, start date, completion date and duration. Include, but do not limit to the following items, as appropriate to this contract:
  - a. Shop drawing review by the Engineer.

- b. Material and Equipment:
    - (1) Order.
    - (2) Manufacture.
    - (3) Delivery.
    - (4) Installation.
    - (5) Startup.
    - (6) Operation and maintenance training
  - c. Performance tests and supervisory service activities.
  - d. Excavation and grading.
  - e. Concrete placement sequence.
  - f. Construction of various facilities.
  - g. Construction of various segments of utilities.
  - h. Subcontractor's items of work.
  - i. Allowance for inclement weather.
  - j. Contract interfaces, date of Substantial Completion.
  - k. Interfacing and sequencing with existing facilities and utilities.
  - l. Sequencing of major construction activities.
  - m. Milestones and completion dates.
4. Schedule Updating
- a. Revise the Progress Schedule after each meeting, event, or activity where schedule changes have been recognized or made.
  - b. Revised Progress Schedule shall present adjusted Work to meet milestones and Substantial Completion.
  - c. Submit revised Progress Schedule to Engineer for acceptance.
- C. Schedule of Shop Drawing and Sample Submittals

1. Coordinate Shop Drawing and Sample Schedule with subcontractors, suppliers, Schedule of Values, and Progress Schedule.
  2. Prepare the schedule in chronological order. Provide the following information:
    - a. Scheduled date for the each Shop Drawing and Sample submittal.
    - b. Related Specification Section number.
    - c. Name of the subcontractor or supplier.
    - d. Description of the part of the Work covered.
    - e. Scheduled date for the Engineer's final release or approval for each Shop Drawing and Sample submittal.
- D. Schedule of Values
1. Unit Price Bid Schedule shall be the Schedule of Values for the basis of progress payments.

#### **1.04 ACTION SUBMITTAL PROCEDURES**

- A. Submittal identification system
1. Use submittal identification system, consisting of Specification Section number, submittal number and resubmittal number.
  2. Use Specification Section number for items submitted within that section.
  3. Use submittal number for each submittal associated with items in that section; e.g. submittal number 1 could have 2 items from the Specification Section and submittal number 2 could have 3 additional items from the Specification Section.
  4. Use resubmittal number for items being resubmitted; e.g. submittal number 1 may require resubmittal, therefore, the number is Specification Section, submittal number 1, and resubmittal number 1. For subsequent resubmittals, add a consecutive number.
- B. Action Submittal Transmittal Form
1. Provide separate completed Action Submittal Transmittal Form with each submittal.
  2. Use the Action Submittal Transmittal Form, as attached to this Specification Section.

3. Use separate transmittal form for each Specification Section and each submittal.
4. Provide detailed description of the submittal on the Action Submittal Transmittal Form.
5. If there are any variations that a Shop Drawing or Sample may have from the requirements of the Contract Documents, then submit with the submittal a separate written communication to Engineer providing notice of any variations.

C. Contractor's Approval of Action Submittals

1. Before submitting Action Submittals to Engineer, Contractor shall:
  - a. Review and coordinate the submittal with other Action Submittals and with the requirements of the Work and the Contract Documents;
  - b. Determine and verify field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information;
  - c. Determine and verify the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
  - d. Determine and verify all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
  - e. Verify that submittal contains sufficient information for Engineer to determine compliance with the Contract Documents.
2. Contractor's stamp or written certification
  - a. Each submittal shall bear a stamp or specific written certification with signature representing that Contractor has reviewed the submittal in accordance with the requirements of the Contract Documents, and that Contractor approves the submittal.
  - b. Submittals without Contractor's stamp/certification and signature will be returned without review. Signatures that appear to be computer-generated will be treated as unsigned and the submittal will be returned without review.



- c. Place the Contractor's stamp on each page or index page, which shows items contained in the Submittal, which shall contain as a minimum a statement of approval and a signature.
- d. Signing the Action Submittal Transmittal Form does not replace the Contractor's stamp/certification on each submittal.

D. Action Submittal Process

1. Submit to individual and location established at the Preconstruction Conference.
2. Engineer's review time will be as established in the accepted Schedule of Shop Drawing and Sample Submittals.
3. In resubmittal, identify changes made from previous submittals.
4. Engineer will not recognize or process submittals not requested in the Contract Documents.
5. Contractor shall maintain a copy of approved submittals at the construction site.

E. Engineer's Action

1. Engineer will review Action Submittals in accordance with Paragraph 7.16.D of the General Conditions.
2. After review, Engineer will mark the submittal with an appropriate action and return to Contractor.
3. The Engineer will mark the Action Submittal Transmittal Form with one of the following dispositions:
  - a. "No Exceptions Taken" – Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.
  - b. "Make Corrections Noted" - Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
  - c. "Revise and Resubmit" - Do not proceed with work covered by the submittal. Revise submittal or provide new submittal in accordance with Engineer's notations.
  - d. "Rejected" - Do not proceed with work covered by the submittal. Indicates material or equipment that cannot be approved. Upon

return of submittal marked "Not Approved", repeat initial submittal procedure utilizing approvable material or equipment.

4. Variation from Contract Document Requirements
  - a. Engineer will review any Contractor identified variations identified in writing to Engineer.
  - b. Engineer will determine if variation is acceptable.
  - c. If the variation is acceptable, Engineer will provide written approval of each variation by specific written notation on the submittal and documented in a Field Order.

#### **1.05 INFORMATIONAL SUBMITTAL PROCEDURES**

- A. Submit identified Informational Submittals on a timely basis to Engineer for review.
- B. Informational Submittals will not receive a written response from the Engineer, if complete and results meet the requirements of the Contract Documents.
- C. A written response will respond to Contractor, if incomplete information is submitted or the results shown on the submittal does not meet the requirements of the Contract Documents.

#### **1.06 TRANSMITTAL OF SUBMITTALS**

- A. Action Submittals and Informational Submittal
  1. Provide each Action Submittal with completed Action Submittal Transmittal Form.
  2. Provide informational submittals with project name, specification section and sufficient information to identify for what the information pertains.
  3. Provide closeout submittals in accordance with Specification Section 01 78 00 Closeout Submittals.
- B. Electronic Submittals
  1. Electronic files shall be in "portable document format (PDF)". Files shall be electronically searchable.
  2. Provide electronic files via e-mail.

3. Organization and Content
  - a. Each electronic submittal shall be one file; do not divide individual submittals into multiple files.
  - b. When submittal is large or contains multiple parts, provide PDF file with bookmark for each section of submittal.
  - c. Content shall be identical to paper submittal. First page of electronic submittal shall be Action Submittal Transmittal Form.
  - d. Provide electronic submittal files from the original and shall be clear and legible.
    - (1) Do not provide scans of faxed copies.
    - (2) Electronic file shall be full size of original paper documents.
    - (3) All pages shall be properly oriented for reading on a computer screen.
4. Provide sufficient Internet service and e-mail capability for Contractor's use in transferring electronic submittals and electronic correspondence.
- C. Provide three (3) paper copies of final approved Action Submittals.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION**



## ACTION SUBMITTAL TRANSMITTAL FORM

SPECIFICATION NO.	_____
SUBMITTAL NO.	_____
RESUBMITTAL NO.	_____

DATE: \_\_\_\_\_ PROJECT NAME: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_ CONTRACT NO. \_\_\_\_\_

NO. OF COPIES	DESCRIPTION

I certify that the above-submitted item(s) satisfy the Contractor's obligations under the Contract Documents with respect to Contractor's review of the submittal, and that Contractor approves the submittal. A separate written communication to Engineer is provided as a notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. Each variation is noted on each Shop Drawing submitted.

\_\_\_\_\_  
(Signature of Contractor)

<b>Submittal Review (<u>For Engineer's Use Only</u>)</b>	
<b>To:</b>	<b>Target Date:</b>
<b>Reviewer Initials and Date:</b>	
<b>Comments:</b>	
Disposition:	
<input type="checkbox"/> No Exceptions Taken <input type="checkbox"/> Make Corrections Noted <input type="checkbox"/> Revise and Resubmit <input type="checkbox"/> Rejected	
<b>Returned By:</b>	<b>Date:</b>

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

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Regulatory Requirements
  - 2. References
  - 3. Quality Assurance
  - 4. Quality Control

**1.02 REGULATORY REQUIREMENTS**

- A. Authority and Precedence of Codes, Ordinances, and Standards
  - 1. All codes, ordinances and standards referenced in the Drawings and Specifications shall have the full force and effect as though printed in their entirety in the Specifications.
  - 2. Precedence
    - a. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.
    - b. Where the Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than by applicable codes, ordinances and standards, the Drawings and Specifications shall take precedence so long it is legal.
    - c. Where no requirements are identified in the Drawings or Specifications, comply with all requirements of applicable codes, ordinances and standards of authorities having jurisdiction.
- B. Location of Transmission Facilities
  - 1. The term “Transmission facilities” includes all pipes, pipelines, wires, cables, ducts, wirelines and associated facilities, whether underground or aboveground, regardless of the nature of their transmittants or of their in-service application.
    - a. The term includes, but is not restricted to, utility facilities, government-owned facilities, facilities transporting hazardous

materials, communications and data facilities, drainage and water facilities and sewer systems.

b. The term does not include culverts.

2. Under the provisions of Wisconsin Statutes, Section 182.0175, contact all transmission facilities owners in the Work area a minimum of three (3) working days prior to beginning construction so affected transmission facilities owners can locate and mark their transmission facilities prior to start of construction work.
3. Take reasonable action to learn the location of any transmission facilities in and near the area where excavation is to be conducted.
4. Perform excavation work to avoid interference with transmission facilities in and near the excavation area to the extent possible meeting the requirements of Wisconsin Statutes, Section 182.0175.

C. Property Monuments

1. Protect property and road right-of-way monuments from movement.
2. Replace disturbed property and right-of-way monuments in accordance with Wisconsin Statutes 236 by a registered land surveyor.
3. Obtain permission of the governing body of the local municipality or county to remove property monument or right-of-way monument or report disturbance or removal to the governing body.
4. The cost of replacement of any monuments moved or destroyed during construction shall be the Contractor's responsibility.

D. Discharging chlorinated water system water to Surface Waters

1. Comply with Wisconsin Department of Natural Resources General WPDES Permit to Discharge Water Supply System Water.
2. Obtain any permits necessary to discharge or dispose of any chlorinated water and provide a copy to the Owner' Representative.
3. Water discharged to a surface water or wetland shall not exceed chlorine level normally found in the drinking water supply (<1.0 total chlorine).
  - a. Test existing water system chlorine levels prior to discharging chlorinated water to surface.
  - b. Test chlorine levels of water to be discharged to surface.

- c. Proceed with discharge when chlorine levels meet chlorine discharge requirements.

E. Traffic Control

1. Provide traffic control in accordance with the requirements of the governmental entity responsible for the road and obtained permits.
2. Provide traffic control facilities including barricades, signs, lights, warning devices, pavement markings, flaggers, etc.
3. Construct and use traffic control facilities in accordance with the U.S.D.O.T. Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways.
4. Provide traffic control devices as required to properly safeguard the public travel through final completion, including during periods of suspension of work.

### 1.03 REFERENCES

A. Definitions

1. Basic Contract definitions and terminology are included in the General Conditions of the Contract and the Supplementary Conditions.
2. The term "approved," when used to convey Engineer's action on Contractor's submittals, applications, and requests, is limited to Engineer's duties and responsibilities as stated in the General Conditions of the Contract.
3. The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

B. Reference Standards

1. Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are a part of the Contract Documents by reference.
2. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

3. If compliance with two or more specified standards and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
4. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.
5. Each section of the specifications generally includes a list of reference standards normally referred to in that respective section. The purpose of this list is to furnish the Contractor with a list of standards normally used for outlining the quality control desired on the project. The lists are not intended to be complete or all-inclusive, but only a general reference of standards that are regularly referred to.
6. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

C. Specification Formats and Conventions

1. The Specifications are organized into Divisions and Sections using the 48-division format and The Construction Specifications Institute “MasterFormat” 2015 Edition Numbering and Titles.
2. The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
3. General and Supplementary Conditions of the Contract apply to all Specification Sections.
4. Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.

## 1.04 QUALITY ASSURANCE

A. Reports and Documents



1. Test and Inspection Reports: Prepare and submit certified written reports specified in other Specification Sections to include the following:
  - a. Date of issue.
  - b. Project title and number.
  - c. Name, address, and telephone number of testing agency.
  - d. Dates and locations of samples and tests or inspections.
  - e. Names of individuals making tests and inspections.
  - f. Description of the Work and test and inspection method.
  - g. Identification of product and Specification Section.
  - h. Complete test or inspection data.
  - i. Test and inspection results and an interpretation of test results.
  - j. Record of temperature and weather conditions at time of sample collection and testing and inspecting.
  - k. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - l. Name and signature of laboratory inspector.
  - m. Recommendations on re-testing and re-inspecting.

## **1.05 QUALITY CONTROL**

### **A. General**

1. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
2. Specific quality-control requirements for individual construction activities are specified in the Specification Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
3. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with the Contract Document requirements.

B. Quality Control Services

1. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Owner's Representative.
2. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - a. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - b. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
3. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify the Work complies with requirements, whether specified or not.
  - a. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
  - b. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing with Owner.
  - c. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  - d. Where quality control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality control service.
  - e. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  - f. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
4. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work.

- a. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
5. Re-Testing/Re-Inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including re-testing and re-inspecting, for construction that revised or replaced Work, at the Contractor's expense that failed to comply with the Contract Documents.
  6. Testing Agency Responsibilities
    - a. Cooperate with Owner's Representative and Contractor in performance of duties.
    - b. Provide qualified personnel to perform required tests and inspections.
    - c. Notify Owner's Representative and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
    - d. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
    - e. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
    - f. Submit a certified written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
    - g. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
    - h. Do not perform any duties of Contractor.
  7. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested.
    - a. Notify agency sufficiently in advance of operations to permit assignment of personnel.
    - b. Provide the following:
      - (1) Access to the Work.

- c. Incidental labor and facilities necessary to facilitate tests and inspections.
  - d. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  - e. Facilities for storage and field curing of test samples.
  - f. Delivery of samples to testing agencies.
  - g. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - h. Security and protection for samples and for testing and inspecting equipment at Project site.
8. Coordination
- a. Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - b. Schedule times for tests, inspections, obtaining samples, and similar activities.
9. Special Tests and Inspections
- a. Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
  - b. Testing agency will notify Owner's Representative and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - c. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Owner's Representative with copy to Contractor and to authorities having jurisdiction.
  - d. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - e. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

- f. Testing agency will re-test and re-inspect corrected work.

**PRODUCTS (Not Used)**

**EXECUTION**

**2.01 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- C. Protect construction exposed by or for quality control service activities.
- D. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

**END OF SECTION**

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

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Temporary Utilities
    - a. Temporary Water
  - 2. Construction Facilities
    - a. Sanitary Facilities
  - 3. Construction Aids
  - 4. Vehicular Access and Parking
    - a. Traffic Control
  - 5. Temporary Barriers and Enclosures
    - a. Enclosures
    - b. Temporary Barricades
    - c. Temporary Fencing
    - d. Temporary Tree and Plant Protection
  - 6. Temporary Controls
    - a. Temporary Erosion and Sediment Controls
    - b. Dust Control
  - 7. Temporary Services During Construction
    - a. Postal Service
    - b. Solid Waste Collection

**1.02 REFERENCES**

- A. American National Standards Institute (ANSI)  
ANSI A10 Construction Package, Parts 1 to 49

- B. National Electrical Contractors Association (NECA)
  - NECA 200 Standard for Installing and Maintaining Temporary Electrical Power at Construction Sites
- C. National Fire Protection Association (NFPA)
  - NFPA 10 Standard for Portable Fire Extinguishers
  - NFPA 70E Standard for Electrical Safety in the Work Place
  - NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations

### **1.03 QUALITY ASSURANCE**

- A. Comply with industry standards and with applicable laws and regulations of authorities having jurisdiction, including but not limited to the following:
  1. Health and safety regulations.
  2. Utility company regulations.
  3. Police, fire department and rescue squad rules.
  4. Environmental protection regulations.
  5. NFPA 241 “Standards for Safeguarding Construction, Alterations and Demolition Operations”.
  6. ANSI-A10 Series standards for “Safety Requirements for Construction and Demolition”.
  7. NECA Electrical Design Library “Temporary Electrical Facilities”, NFPA 70, and NEMA, NECA and UL standards and regulations for temporary electric service.
- B. Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Provide undamaged materials in serviceable conditions and suitable for use intended.

### **2.02 TEMPORARY SELF-CONTAINED TOILET UNITS**

- A. Provide temporary self-contained toilet units of temporary single-occupant toilet units of the chemical, aerated recirculation, or combustion type for use by all



construction personnel.

- B. Properly vent and fully enclose with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and other elements.
- D. Remove each temporary facility when need for its service has ended.
- E. Materials and facilities that constitute temporary facilities are the property of Contractor.
- F. Restore area to preconstruction conditions or better providing excavation, landscaping, and other restoration as necessary.
- G. Maintain facilities in good operating condition until removal.
- H. Maintain markers for underground lines.
- I. Protect underground lines from damage during excavation operations.
- J. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
- K. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for subsoil or fill in the area.
- L. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns.
- M. Repair or replace street paving, curbs, and sidewalks at temporary entrances, in accordance with the requirements of the governing authority.

### **3.02 TEMPORARY UTILITIES**

#### **A. Temporary Water**

1. Provide temporary water service and distribution piping of sizes and pressures adequate for construction needs.
2. Sterilize water piping prior to use.
3. Obtaining Water from existing fire hydrants.
  - a. Water may be available from Owner designated hydrants at cost to the Contractor for water use.
  - b. Obtain permission from the water utility, obtain necessary permits and notify Engineer and Fire Department before obtaining water from fire hydrants.
  - c. Meet requirements of water utility for cost of water, connecting to hydrant, providing backflow protection, flow measurement, and temporary piping and/or transportation required to transport water to point of use.
  - d. If water utility agrees to Contractor operating hydrants, use only special hydrant operating wrenches to open and close hydrants.
    - (1) Fully open hydrant valve.
    - (2) Notify water utility if hydrant damage occurs while Contractor use, so damage can be repaired as quickly as possible.
    - (3) Maintain complete fire department accessibility to fire hydrants.

### **3.03 CONSTRUCTION FACILITIES**

#### **A. Sanitary Facilities**

1. Provide toilets, wash facilities and drinking water fixtures in compliance with regulations and health codes for type, number, location, operation and maintenance of fixtures and facilities.
2. Provide toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility, and provide covered waste containers for used materials.
3. Install separate self-contained toilet units for male and female personnel shielded to ensure privacy.

4. Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition.
5. Dispose of drainage properly.
6. Supply cleaning compounds appropriate for each condition.
7. Include safety showers, eyewash fountains and similar facilities for the convenience, safety and sanitation of personnel.
8. Provide drinking water fountains or containerized tap-dispenser bottled-drinking water units, complete with paper cup supplies. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55°F (7 to 13°C).

### **3.04 CONSTRUCTION AIDS**

- A. Provide facilities for hoisting materials and personnel.

### **3.05 VEHICULAR ACCESS AND PARKING**

- A. Provide access to the Site as established on the Drawings as required for the work.
- B. Provide additional land required for storage of material, locating trailers, or other temporary facilities where land not available at the Site.
- C. Acquire, construct, maintain, and restore any temporary access facilities required.
- D. Provide access to fire hydrants at all times. Do not inhibit access to other utilities.
- E. Traffic Control
  1. Permits: Obtain necessary permits to close streets or detour traffic.
  2. Maintaining Local Access: Maintain local access and access to driveways along project. Do not disruption of access more than 24 consecutive hours.
  3. Notification: Notify Owner, local police, school district, and fire department in writing at least 24 hours in advance of detouring traffic or closing street. Notify adjacent residents and businesses in writing at least 24 hours prior to closing their driveway access.
  4. Barricades: Provide traffic barricades in accordance with “The Manual on Uniform Traffic Control Devices (MUTCD); Part VI, Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations.”

5. Traffic control and signing shall meet guidelines set forth in the MUTCD for road closures and road construction and traffic control details shown in the Drawings.

### **3.06 TEMPORARY BARRIERS AND ENCLOSURES**

#### **A. Enclosures**

1. Provide temporary enclosures for protection of construction, in progress or completed, from exposure, inclement weather, other construction operations and similar conditions.
2. Where heat is needed and the building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions or unacceptable effects.
3. Install tarpaulins securely with incombustible framing. Close openings of 25 sq. ft. (2.3 sq. m.) or less with plywood or similar materials.
4. Close openings through floor or roof decks and other horizontal surfaces with load-bearing wood-framed construction.
5. Where enclosure exceeds 100 sq. ft. (9.2 sq. m) in area, use UL labeled fire-retardant-treated wood and plywood for framing and sheathing.
6. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

#### **B. Temporary Barricades**

1. Provide barricades, warning signs, and lights around construction activities.
2. Comply with standards and code requirements for erecting structurally adequate barricades.
3. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard involved.
4. Where appropriate and needed, provide lighting, including flashing red or amber lights.

C. Temporary Fencing

1. When excavation begins, install an enclosure fence with lockable entrance gates to prevent people and animals from easily entering the site, except by the entrance gates.
2. Locate where indicated or, if not indicated, enclose the entire site or the portion determined sufficient to accommodate construction operations.
3. Where created obstructions will last less than 24 hours, provide temporary fencing consisting of International orange high strength polyethylene, Mirafi Mirasafe securely fastened to steel or wooden posts driven 12 inches into ground.

D. Temporary Tree and Plant Protection

1. Provide protection of existing trees and shrubbery near or within the Site not shown on Drawings for removal.
2. Protection includes root system within drip line in addition to trunk, limbs and branches.
3. Trim branches, if required, with written permission of Owner.
4. Replace damaged trees with like kind or species determined by Owner.
  - a. Replace shrubbery and trees with minimum 3” diameter tree.
  - b. In addition to replacement, compensation to the Owner may be required to make owner whole for damage.
  - c. Estimating tree value cost shall be determined in accordance with “The Council of Tree and Landscape Appraisers (CTLA) Guide for Plant Appraisal (8th Edition)”.

**3.07 TEMPORARY CONTROLS**

A. Temporary Erosion and Sediment Control

1. Provide temporary erosion and sediment control in accordance with the appropriate specification section.

B. Temporary Environmental Controls

1. Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result.

2. Avoid using tools and equipment that produce harmful noise.
3. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons near the site.

C. Dust Control

1. Maintain temporary site roadways, Owner's existing roads, and public roads used during construction operations to minimize conditions causing dust.
2. Comply with local environmental regulations for dust control.
3. If dust control measures are considered inadequate, provide additional dust control methods.
4. Provide dust control in accordance with the appropriate specification section.

### **3.08 TEMPORARY SERVICE DURING CONSTRUCTION**

A. Postal Service

1. Coordinate delivery of mail with the USPS.
2. Maintain postal service to all properties within the project area. Meet the needs of physically challenged individuals within the project area.
3. When construction staging prohibits access to normal mailbox locations by the USPS, establish temporary mail service as follows:
  - a. Coordinate with the USPS to establish an acceptable location for a temporary group mailbox.
  - b. Verify proposed location with the Engineer prior to installation.
  - c. Erect and maintain a temporary group mailbox or provide a temporary USPS approved cluster box unit.

B. Solid Waste Collection

1. Coordinate collection of solid waste with property owners and the solid waste collection agencies operating in the project area.
2. Maintain access for solid waste collection vehicles during construction.

3. When construction staging prohibits access to normal collection locations by solid waste collection vehicles, comply with the following:
  - a. Coordinate with solid waste collection agencies to establish a common location for collection outside the inaccessible area.
  - b. Coordinate with residents/businesses within the project area for the alternate solid waste collection procedures.
  - c. Affix a temporary label to solid waste containers identifying the property owner's or renter's name or address.
  - d. Prior to the normal collection time, gather containers from properties within the inaccessible area, and transport to the common location accessible by solid waste collection vehicles.
  - e. Return solid waste containers to each property within 24 hours after collection.

**END OF SECTION**

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**SECTION 01 71 13  
MOBILIZATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Mobilization for preparatory work and operations required prior to beginning Work.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination
  - 1. Determine appropriate personnel, tools, equipment, materials, supplies, and incidentals required to properly perform the Work.
  - 2. Move appropriate personnel, tools, equipment, materials, supplies, and incidentals to the Project Site as required to perform the Work.
  - 3. Upon completion of the Work, remove personnel, tools, equipment, materials, supplies, and incidentals from the Project Site.
  - 4. Restore disturbed areas outside the Project Site to a preconstruction condition.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 01 71 23  
FIELD ENGINEERING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Engineering Surveys Provided by the Engineer.
  - 2. Surveys Provided by the Contractor.
  - 3. Profile and Topography Shown on the Drawings.
  - 4. Record Measurements and Markers.

**1.02 SUBMITTALS**

- A. Provide record measurements of facilities as installed.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.01 PREPARATION**

- A. Investigate and verify the existence and location of site improvements, utilities, and other existing facilities.
- B. Before construction, verify the location of invert elevations at points of connection of sanitary sewer, storm sewer, water piping and underground electrical services.
- C. Furnish information to the Engineer and the appropriate utility regarding conflicts that are necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction.
- D. Provide the Engineer two (2) working days advance notification when ready for engineering surveys for construction.

**3.02 ENGINEERING SURVEYS PROVIDED BY THE ENGINEER**

- A. General
  - 1. Establish benchmarks for construction as shown on the Drawings.
  - 2. Establish construction reference stakes as shown on the Drawings.

- B. Gravity Sewer Systems
  - 1. Provide construction reference stakes set for pipe construction location at critical changes in horizontal and vertical alignment.
  - 2. Provide construction stakes for location of pipe at connections.
- C. Driveways
  - 1. Provide one construction reference stake at changes in horizontal and vertical alignment, at 50-foot stations and at 25-foot stations within a horizontal curve or vertical curve.
  - 2. Provide one construction reference stake at the corners of driveways.
- D. Site Improvements
  - 1. Provide construction reference stakes for location of construction limits.
  - 2. Provide construction reference stakes to establish a reference line from which facilities can be located.
  - 3. Provide benchmarks as shown on the Drawings.
  - 4. Engineer to provide CAD files for reference, if requested.

### **3.03 SURVEYS TO BE PROVIDED BY THE CONTRACTOR**

- A. General
  - 1. Locate, preserve, and protect established construction reference stakes, benchmarks, and control points.
  - 2. Locate, preserve, and protect property corners and section corner monuments.
  - 3. Provide additional construction staking as necessary to complete construction based on the construction reference stakes provided by the Engineer and the Drawings.
  - 4. Before beginning with necessary construction staking, verify the information shown on the Drawings, in relation to the established construction reference stakes, benchmarks, control points and property corners. Notify the Engineer of any discrepancies.
  - 5. Remove construction reference stakes when directed by the Engineer.

- B. Gravity Sewer Systems and Water Distribution Systems
  - 1. Provide any intermediate construction reference points as required to verify installation at the line and grade established and locate appurtenant structures.
  - 2. Check the line and grade with the construction reference stakes at each pipe length.

### **3.04 PROFILE AND TOPOGRAPHY SHOWN ON THE DRAWINGS**

- A. Contours or profiles of the ground are shown on the Drawings. These profiles and contours are reasonably correct, but are not guaranteed to be absolutely so, and together with any schedule of quantities are presented only as an approximation.

### **3.05 RECORD MEASUREMENTS AND MARKERS**

- A. Provide record survey information of the completed facilities showing the horizontal and vertical location of buried utilities, structures, and other facilities covered when construction is complete.
- B. Gravity Sewer Systems, Water Distribution Systems, and Sewage Force Mains
  - 1. At a minimum, provide a record survey recording the horizontal and vertical location of the following:
    - a. Underground covered work that deviates from the Drawings.
    - b. Valves and pipeline fittings.
    - c. Changes in direction.
    - d. Flow line elevation of gravity sewer stubs.
    - e. "Y" or "T" branches on sewers.
    - f. Terminus of sewer services.
  - 2. Provide the following markers showing the horizontal terminus location.
    - a. Storm Sewer Service: Bury vertically, a 6' long 2"x4" orange painted stake with its top extending 24" above ground level.
    - b. Provide a 3' long #4 steel reinforcing bar next to the stake marker to allow magnetic location.

**END OF SECTION**

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**SECTION 01 77 00  
CLOSEOUT PROCEDURES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Substantial Completion
  2. Final Completion
  3. Inspection Procedures
  4. Project Record Documents.
  5. Operation and Maintenance Manuals
  6. Warranties
  7. Instruction of Owner's Personnel
  8. Final Cleaning

**1.02 SUBSTANTIAL COMPLETION**

- A. Before notification that the Work is substantially complete, provide the following:
1. Demonstrate to the Engineer that systems and system components operate as intended.
  2. Advise Owner of pending insurance changeover requirements.
  3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  5. Prepare and submit Project Record Documents, operation and maintenance manuals, construction photographs, damage or settlement surveys, property surveys, and similar final record information.
  6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  8. Complete startup testing of systems.
  9. Submit test/adjust/balance records.
  10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Submit written notification to Owner and Engineer that the entire Work is ready for its intended use and the entire Work is substantially complete.
1. Provide Engineer and Owner an initial draft of punch list items to be completed or corrected before final payment.
  2. If the items in paragraph A. above are complete, then within 14 days Owner, Contractor and Engineer will make an inspection of the Work to determine status of completion.
  3. If Engineer considers the Work substantially complete, then Engineer will prepare and deliver to the Owner a tentative Certificate of Substantial Completion fixing the date of Substantial Completion with an attached tentative list of items to be completed or corrected before final payment.
  4. Engineer will issue a definitive Certificate of Substantial Completion with list of items to be completed or corrected or notify Contractor that the Work is not substantially complete within 21 days after submittal to Owner.
  5. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  6. Results of completed inspection will form the basis of requirements for Final Completion.

### **1.03 FINAL COMPLETION**

- A. Before requesting final inspection for determining final completion, complete the following:
1. Items identified as requiring correction or completion.
  2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.



3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Submit a written notice that the entire Work is complete. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### **1.04 WARRANTIES**

- A. Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Submit properly executed warranties of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11 inch 115-by-280-mm paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

#### **PART 2 - PRODUCTS (Not Used)**

#### **PART 3 - EXECUTION**

##### **3.01 FINAL CLEANING**

- A. Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
  - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
  - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
  - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

**END OF SECTION**

**SECTION 01 78 23**  
**OPERATION AND MAINTENANCE DOCUMENTATION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes:
  - 1. Obtaining and submitting reference texts.
  - 2. Preparing and submitting operation and maintenance manuals for equipment and building systems.
  - 3. Preparing and submitting equipment maintenance data cards.

**1.02 SUBMITTALS**

- A. Submittal Schedule
  - 1. Provide four (4) copies of operation and maintenance manuals.
    - a. Two (2) copies in electronic form
    - b. Two (2) copies in hardcopy form
  - 2. Provide to the Engineer 30 days prior to equipment start-up and operator training or substantial completion, whichever occurs first.
    - a. Partial payment estimates will not be recommended for payment until the draft operation and maintenance manuals are received per schedule.
    - b. Make corrections or modifications to operation and maintenance manuals to comply with the Engineer's comments and/or to accurately describe equipment furnished.
  - 3. Submit final operation and maintenance manual information to the Engineer prior to final payment.
- B. Format of Submittal
  - 1. Prepare operation and maintenance manuals in the form of an instructional manual for use by operating and maintenance personnel.

2. Hardcopy Form

- a. Provide information in white heavy-duty, commercial-quality, three-ring, vinyl-covered, loose-leaf binders not larger than three inches thickness, sized to receive 8½ x 11-inch paper.
  - (1) Provide a clear plastic sleeve on the spine and front cover to hold labels describing contents.
  - (2) Provide pockets in the covers to receive folded sheets.
  - (3) Identify each binder on front and spine, with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered.
- b. Provide heavy paper dividers with celluloid-covered tabs for each separate section.
  - (1) Mark each tab to indicate contents.
  - (2) Provide a typed description of the product or major parts of equipment included in the section on each divider.
- c. Where written material is required, use the manufacturer's standard printed materials or provide specially prepared data, neatly typewritten, on 8½ x 11 inch, 20-lb/sq. ft. white bond paper.
- d. Drawings
  - (1) Where manuals require drawings or diagrams up to 11 x 17-inches, provide reinforced, punched binder tabs on drawings and bind in with text.
  - (2) If drawings are larger than 11 x 17 inch, place the drawing, neatly folded, in an 8½ x 11 inch envelope with punched binder tabs and insert in the binder and insert a typewritten page indicating drawing title, description of contents.

3. Electronic O&Ms:

- a. Provide information on CD once-writeable disc. If more than one disk is needed, label the disks sequentially.
  - (1) Provide disc in protective, hard cover case, with typed printed table of contents on CD cover, referring to contents of specific CD.

- (2) Identify each disc labeled with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered.
- b. Provide the information as a .pdf document.
- c. Provide with a table of contents linked to each equipment system set. List each equipment system Section, to indicate the individual equipment components.
- d. Provide each equipment system in its own section with a typed description of the product or major parts of equipment, included at the beginning in each Section.
- e. Where written material is required, use the manufacturer's standard printed materials or provide specially prepared data. Scan in written materials, and insert into the .pdf document at appropriate location.
- f. Drawings
  - (1) Where manuals require non-electronic drawings or diagrams up to 11 x 17-inches, scan in drawings and insert into .pdf document at appropriate location.
4. If drawings are larger than 11 x 17 inch, place a reference note in the .pdf document to refer to the specific drawing. Then provide the drawing, neatly folded, in an 8½ x 11 inch envelope with punched binder tabs and insert in a labeled binder named "REFERENCED DRAWINGS". Include a typed printed page with the envelope, indicating where the over-sized drawing belongs, referencing the table of contents Sections and numbers.

C. Manual Content

1. Include the following information in each manual for each major component:
  - a. Design factors and assumptions
  - b. Copies of applicable Shop Drawings and Product Data.
  - c. Material, finish, system or equipment identification, including:
    - (1) Name of manufacturer.
    - (2) Model number.
    - (3) Serial number of each component.

- d. Equipment operating data:
    - (1) Operation instructions.
    - (2) Emergency instructions.
    - (3) Wiring diagrams.
    - (4) Inspection and test procedures.
  - e. Maintenance procedures and schedules.
  - f. Precautions against improper use and maintenance.
  - g. Copies of warranties and service contracts.
  - h. Repair instructions, including listings of spare parts for equipment.
  - i. Sources of required maintenance materials and related services.
- 2. Organize each manual into separate sections for each related product or piece of equipment.
  - 3. Provide a title page in a transparent, plastic envelope as the first sheet of each manual. As a minimum, provide the following information:
    - a. Subject matter covered by the manual.
    - b. Name and address of the Project.
    - c. Name of Owner.
    - d. Date of submittal.
    - e. Name, address, and telephone number of the Contractor.
  - 4. After title page, include a typewritten table of contents for each volume.
  - 5. Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name.
    - a. Under each product, list the name, address, and telephone number of the subcontractor or installer and the maintenance contractor.
    - b. Include a local source for replacement parts for equipment.

6. Provide manufacturer's product data.
  - a. Where standard printed data is provided, include only those sheets that are pertinent to the part or product installed.
  - b. Mark each sheet to identify each part or product included in the installation.
  - c. Identify data that is applicable to the installation, and delete references to information that is not applicable.
7. Prepare written test to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper maintenance of materials or finishes, or for proper operation and maintenance of equipment or systems.
  - a. Prepare written text where it is necessary to provide additional information or to supplement data included elsewhere in the manual.
  - b. Organize text in a consistent format under separate headings for different procedures.
  - c. Provide a logical sequence of instruction for each operation or maintenance procedure.
8. Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams.
9. Provide a copy of each warranty or service contract in the appropriate manual for the information of the Owner's operating personnel.
  - a. Provide written data outlining procedures to follow in the event of product failure.
  - b. List circumstances and conditions that would affect the validity of warranty.

### **1.03 EQUIPMENT AND SYSTEMS OPERATION AND MAINTENANCE MANUALS**

- A. Submit four (4) copies of each equipment and systems maintenance manual, in final form, to the Engineer.
  1. Provide two (2) copies in electronic versions in .pdf form
  2. Provide two (2) copies as hardcopies.

- B. Provide separate manuals for each unit of equipment, each building operation system, and each electric and electronic system.
- C. Provide the following information for each piece of equipment, each building operation system, and each electric or electronic system, where applicable:
  - 1. Provide a complete description of each unit and related component parts, including the following, as applicable:
    - a. Equipment or system function.
    - b. Operating characteristics.
    - c. Limiting conditions.
    - d. Performance curves.
    - e. Engineering data and tests.
    - f. Complete nomenclature and number of replacement parts.
  - 2. For each manufacturer of a component part or piece of equipment, provide the following, as applicable:
    - a. Printed operation and maintenance instructions.
    - b. Assembly drawings and diagrams required for maintenance.
    - c. List of items recommended to be stocked as spare parts.
  - 3. Provide information detailing essential maintenance procedures, including the following, as applicable:
    - a. Routine operations.
    - b. Troubleshooting guide.
    - c. Disassembly, repair, and reassembly.
    - d. Alignment, adjusting, and checking.
  - 4. Provide information on equipment and system operation procedures, including the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in.
    - c. Routine and normal operating instructions.



- d. Regulation and control procedures.
  - e. Instructions on stopping.
  - f. Shutdown and emergency instructions.
  - g. Summer and winter operating instructions.
  - h. Required sequences for electric or electronic systems.
  - i. Special operating instructions.
- 5. Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
  - 6. Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
  - 7. Provide as-installed, color-coded, piping diagrams, where required for identification.
  - 8. Provide charts of valve-tag numbers, with the location and function of each valve.
  - 9. For electric and electronic systems, provide complete circuit directories of panelboards, including the following, as applicable:
    - a. Electric service.
    - b. Controls.
    - c. Communication.

**END OF SECTION**

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**SECTION 02 41 13**  
**SELECTIVE SITE DEMOLITION AND UTILITIES ABANDONMENT**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Demolition of Pavements and Driveways
  - 2. Demolition of Walls, Piers, Surface Drains, Foundations, and Concrete or Masonry Structures
  - 3. Removal of Culvert Pipe
  - 4. Removal or Abandonment of Sewer Utility Pipe

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Granular backfill material shall conform to Soil Class D-1 or D-2 stated in the appropriate Specification Section.
- B. Concrete for plugging pipe shall conform to the following:
  - 1. 28 day compressive strength: 3000 psi
  - 2. Maximum size coarse aggregate: 1 1/2"
  - 3. Minimum cement content: 4.75 bags per cubic yard
  - 4. Air content: 6±1
  - 5. Slump: 3 to 4 inches
  - 6. Maximum water/cement ratio: 0.58

**PART 3 - EXECUTION**

**3.01 GENERAL**

- A. Remove existing structures, with attached parts and connections, within limits shown on the Drawings or that interfere with new construction.
- B. Do not damage adjacent portions of existing structures not shown for removal.

1. Complete operations necessary for the removal of any existing structure that might endanger the new construction, prior to the construction of the new Work.
  2. Do not use any equipment or devices that might damage structures, facilities, or property which are to be preserved and retained.
- C. Salvageable Material
1. Remove salvageable material without damage designated to remain the property of the Owner or designated for relocation within the Project and place in location designated by the Owner.
  2. Safeguard and protect salvageable materials designated for relocation within the Project or until delivery to the Owner.

### **3.02 DEMOLITION OF PAVEMENTS, CURB AND GUTTER, SIDEWALKS AND DRIVEWAYS**

- A. Remove pavements, curb and gutter, sidewalks and driveways designated for removal on the Drawings or elsewhere.
- B. Dispose of removed materials offsite at Contractor's selected disposal site.
- C. Remove to an existing joint or saw cut to a true line, with vertical face, minimum depth of two (2) inches.
- D. Provide removal of materials sufficient to provide for proper grades and connections to new work.

### **3.03 DEMOLITION OF WALLS, PIERS, SURFACE DRAINS, FOUNDATIONS, AND CONCRETE OR MASONRY STRUCTURES**

- A. Remove as shown on the Drawings entirely or to an elevation at least three (3) feet below the road earth subgrade or elsewhere to three (3) feet below the finished proposed slopes or natural ground.

### **3.04 REMOVAL OF CULVERT PIPE**

- A. Remove entirely all culverts designated to be removed, except as hereinafter provided for closing culverts.
- B. Remove sidewalls or substructure units in water to an elevation no higher than the elevation of the natural stream or lake bed.
  1. Where grading of the channel is required, remove such units to the proposed finished grade of the stream or lake bed.

- 2. Remove all other sidewalls or substructure units down to at least 2 feet below natural or finished ground line, as the case may be.
- C. Where existing culverts are shown on Drawings to be extended or otherwise incorporated into the new Work, remove only such part or parts of the existing culvert as necessary to provide a proper connection to the new Work.
- D. Remove pipe culverts designated for salvage in a manner that will preclude damage to the culverts.

### **3.05 DISPOSAL OF REMOVED MATERIALS**

- A. Deliver materials designated for salvage to Owner's designated location.
- B. Haul and dispose of all other materials to a site provided by the Contractor in conformance with all governing authorities.

### **3.06 BACKFILLING**

- A. Fill all trenches, holes, and pits resulting from the removal of structures with satisfactory soil, or with broken masonry and satisfactory soil, or with granular backfill.
- B. Place materials in layers not more than 12 inches in thickness.
- C. Thoroughly compact each layer by means of tampers, rollers, or vibrators.
- D. Do not use water to expedite settlement of backfill except with the approval of the Owner's Representative.
- E. Exclude broken masonry from the top 12 inches of the finished earth grades.
- F. Unless otherwise provided, backfill all trenches, holes, and pits to the elevation of the natural ground, the proposed finished earth subgrade, or finished slopes, as may be necessary due to the location of the removed structure.

**END OF SECTION**

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**SECTION 02 41 13.23  
PAVEMENT REMOVAL**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Saw Cutting and Pavement Butt Joints
  - 2. Asphalt and Concrete Pavement Removal
  - 3. Salvaging and Disposal of Materials

**1.02 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

**3.01 PROTECTION OF PAVEMENTS TO REMAIN**

- A. If retaining a portion of the existing pavements, avoid damaging that portion during construction operations.
- B. Protect pavements to remain and do not use any equipment or devices that might damage pavements or property to be preserved.
- C. Pavements designated to remain and damaged by construction operations shall be removed and replaced to limits designated by the Engineer at no cost to Owner.

**3.02 SALVAGING OR DISPOSING OF MATERIALS**

- A. Carefully remove materials designated for salvage to avoid damage.
- B. Place salvaged materials in neat piles outside construction limits but within the right-of-way.
- C. Stockpile salvaged pavement materials designated for salvage and reuse on the project at locations within the construction limits designated by the Drawings.
- D. If the area of construction limits does not support adequate room for stockpiles and construction operations, secure a temporary offsite location for hauling and stockpiling of the salvaged material and reuse on the project.

- E. Stockpile salvaged pavement materials without contaminating the material with dirt or foreign matter.
- F. Properly dispose of pavement materials not designated for salvage and reuse on the project, or if required, hauled to a location designated by the Owner.

### **3.03 SAWCUTTING AND PAVEMENT BUTT JOINTS**

- A. All concrete and asphalt pavements (including butt joints), shoulders and driveways shall be saw-cut to a minimum depth of three (3) inches prior to being shattered and removed.
- B. Where concrete pavements are covered with an asphalt overly, both the asphalt and concrete shall be saw-cut.
- C. Pavements shall be saw-cut in neat straight lines, at right angles to the street or driveway, to produce a clean joint for adjoining pavement installation.
- D. Protect saw-cut edges during construction operations. If a saw-cut edge is damaged during construction, saw-cut the pavement again immediately prior to paving at no additional cost to Owner.
- E. Milled butt joints are not required to be saw-cut if the milled edge is neat and straight.
- F. All concrete and asphalt pavements within state highway rights-of-ways shall be saw-cut full depth prior to being shattered and removed.

### **3.04 ASPHALT AND CONCRETE PAVEMENT REMOVAL**

- A. Remove pavements to the removal limits shown on the Drawings.
  - 1. Prior to removals, saw-cut pavement in accordance to the removal limits shown on the Drawings or marked on site by the Engineer.
  - 2. Perform removal operations in a manner not to damage saw-cuts, remaining pavement, and structures such as curb and gutter.
- B. Load and haul pavement off-site as removed.
- C. Identify the locations and protect all structures/structure access castings from damage during the removal process.
- D. Provide proper traffic safety devices at all locations of structures/casting protruding above the grade.
- E. Provide and maintain temporary ramping at all locations at the limits of the removed pavement that provide vehicle access to roadways and driveways.

**END OF SECTION**



**SECTION 26 05 33**  
**CONDUIT**

**PART 1 - GENERAL**

**1.01 SUBMITTALS**

- A. Conduit – submit product data and catalog sheets for all components.
- B. Boxes – provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.

**PART 2 - PRODUCTS**

**2.01 RIGID POLYVINYL CHLORIDE CONDUIT (PVC) AND FITTINGS**

- A. Conduit: Rigid non-metallic conduit, Schedule 80 PVC minimum, Listed, sunlight resistant, rated for 90<sup>0</sup> C conductors.
- B. Fittings and Conduit Bodies: NEMA TC 2, Listed.

**PART 3 - EXECUTION**

**3.01 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT**

- A. EMT is permitted to be used in sizes 4" (50 mm) and smaller for power and low-voltage systems. See CONDUIT INSTALLATION SCHEDULE below for other limitations for EMT and other types of conduit.
- B. Maintain minimum 6 inch (150 mm) clearance between conduit and piping. Maintain 12 inch (300 mm) clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
- C. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized pipe straps, conduit racks (lay-in adjustable hangers), clevis hangers, or bolted split stamped galvanized hangers.
- D. Group conduit in parallel runs where practical and use conduit rack (lay-in adjustable hangers) constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.
- E. Do not fasten conduit with wire or perforated pipe straps. Before conductors are pulled, remove all wire used for temporary conduit support during construction.
- F. Support and fasten metal conduit at a maximum of 8 feet (2.4 m) on center.
- G. Supports shall be independent of the installations of other trades, e.g. ceiling support wires, HVAC pipes, other conduits, etc., unless so approved or detailed.

- H. Changes in direction shall be made with symmetrical bends, cast steel boxes, stamped metal boxes or cast steel conduit bodies.
- I. For indoor conduits, no continuous conduit run shall exceed 100 feet (30 meters) without a junction box.
- J. All conduits installed in exposed areas shall be installed with a box offset before entering box.

### **3.02 CONDUIT INSTALLATION**

- A. Cut conduit square; de-burr cut ends.
- B. Conduit shall not be fastened to the corrugated metal roof deck.
- C. Bring conduit to the shoulder of fittings and couplings and fasten securely.
- D. Use conduit hubs for fastening conduit to cast boxes. Use sealing locknuts or conduit hubs for fastening conduit to sheet metal boxes in damp or wet locations.
- E. Terminate all conduit (except for terminations into conduit bodies) using conduit hubs, or connectors with one locknut, or shall use double locknuts (one each side of box wall) and insulated bushing. Provide bushings for the ends of all conduit not terminated in box walls.
- F. Install no more than the equivalent of:
  - 1. Three 90 degree bends between boxes for electrical systems.
  - 2. Two 90 degree bends between boxes for communications and other low voltage systems.
- G. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch (50 mm) size unless sweep elbows are required.
- H. Bend conduit according to manufacturer's recommendations. Torches or open flame shall not be used to aid in bend of PVC conduit.
- I. Use suitable conduit caps or other approved seals to protect installed conduit against entrance of dirt and moisture.
- J. Provide 1/8 inch (3 mm) nylon pull string in empty conduit, except sleeves and nipples.
- K. Install expansion-deflection joints where conduit crosses building expansion joints. Note: expansion-deflection joints are not required where conduit crosses building control joints if the control joint does not act as an expansion joint. Install expansion fitting in PVC conduit runs as recommended by the manufacturer.

- L. Avoid moisture traps where possible. Where moisture traps are unavoidable, provide junction boxes with drain fittings at conduit low points.
- M. Where conduit passes between areas of differing temperatures such as into or out of cool rooms, freezers, unheated and heated spaces, buildings, etc., provide Listed conduit seals to prevent the passage of moisture and water vapor through the conduit.
- N. Route conduit through roof openings for piping and ductwork where possible.
- O. Where communication cabling is to be installed in conduit to the wiring hub (e.g. Telcom Room), multiple conduits may be consolidated into fewer, larger conduits. Capacity of shared conduits shall equal the capacity of the individual conduits unless otherwise noted.
- P. Use U.L. listed metallic grounding clamps when terminating conduit to cable tray.
- Q. Conduit is not permitted in any slab topping of two inches (50 mm) or less.
- R. Maximum Size Conduit in Slabs Above Grade: 3/4 inch (19 mm). Do not route conduits to cross each other in slabs above grade.
- S. PVC conduit shall transition to galvanized rigid metal conduit before it enters a concrete pole base.
- T. PVC conduit shall transition to galvanized rigid metal conduit before it enters a foundation, wall (where exposed) or up through a concrete floor.
- U. All conduit installed underground (exterior to building) shall be buried a minimum of 24" below finished grade, whether or not the conduit is concrete encased.
- V. Clean PVC conduit with solvent, and dry before application of glue. The temperature rating of glue/cement shall match weather condition. Apply full even coat of cement/glue to entire area that will be inserted into fitting. The entire installation shall meet manufacturer's recommendations.

**END OF SECTION**

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**SECTION 31 11 00  
CLEARING AND GRUBBING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Clearing
  - 2. Grubbing
  - 3. Replacement and Charges for Damaged Trees and Shrubs
  - 4. Disposal

**1.02 QUALITY ASSURANCE**

- A. Regulatory requirements:
  - 1. Conform to applicable local code for disposal of debris
  - 2. Coordinate Work with utility companies

**PART 2 - PRODUCTS**

**2.01 REFERENCES**

- A. The Council of Tree and Landscape Appraisers (CTLA):  
CTLA Guide for Plant Appraisal (8<sup>th</sup> Edition)

**PART 3 - EXECUTION**

**3.01 PREPARATION**

- A. Protect utilities, benchmarks, property monuments, and adjacent property.
- B. Provide temporary fences, barricades, coverings, and other protections to preserve existing trees and shrubs to remain.

**3.02 CLEARING**

- A. Clear trees and shrubs within construction limits indicated for removal on the Drawings.
  - 1. Do not remove trees and shrubs unless specifically stated for removal on the Drawings.

2. Unless shown on the Drawings, do not remove trees without Engineer's approval.
  3. Complete clearing in a manner that prevents obstruction to traffic.
- B. Clearing consists of the felling, trimming, and cutting of trees into sections and satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas cleared.
  - C. Cut trees, stumps, roots, brush, and other vegetation in areas cleared flush with or below the original ground surface, except such trees and vegetation as indicated to be left standing.

### **3.03 GRUBBING**

- A. Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches diameter, and matted roots from the areas designated for clearing.
- B. Remove grubbed material together with logs and other organic or metallic debris to a depth of not less than 18 inches below original ground surface level.
- C. Fill depressions made by grubbing with suitable material conforming to the adjacent material and compact to level of original ground.

### **3.04 REPLACEMENT AND CHARGES FOR DAMAGED TREES AND SHRUBS**

- A. Replace damaged trees and shrubs designated to remain in place with like kind or species determined by Owner.
- B. Replace damaged trees with minimum 3" diameter.
- C. Additional tree liability charges to Contractor will be based on estimated tree value lost determined in accordance with "The Council of Tree and Landscape Appraisers (CTLA) Guide for Plant Appraisal (8th Edition)."

### **3.05 DISPOSAL**

- A. Dispose of all cleared and grubbed material in a safe manner in accordance with local, state, and federal laws and requirements.
- B. Obtain any necessary permits and approvals required to properly dispose off-site, burn, bury, or dump cleared and grubbed material.
- C. Conform to all requirements for disposal of diseased trees.
- D. Remove debris, rock and extracted plant life from Site.

**END OF SECTION**

**SECTION 31 23 00  
EXCAVATION AND FILL**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Site Preparation
  - 2. Excavation
  - 3. Stockpiling
  - 4. Filling
  - 5. Placing Layers
  - 6. Grading
  - 7. Compaction and Moisture Requirements
  - 8. Borrow

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM D1556 Test for Density of Soil in Place by the Sand-Cone Method
  - ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Lb (4.54 kg) Rammer and 18 in. (457 mm) Drop
  - ASTM D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
  - ASTM D2487 Standard Test Method for Classification of Soils for Engineering Purposes
  - ASTM D6938-07 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
  
- B. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO T99 Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305mm (12-in.) Drop
  - AASHTO T191 Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method

AASHTO T310 Standard Method of Test for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

C. Wisconsin Department of Natural Resources (WDNR)

WDNR Wetland General/Individual Permit Conditions

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Informational Submittals
  - 1. Field or Site Quality Control Submittals –Submit two (2) copies of the results of quality control testing (include location where tests were performed).

### **1.05 QUALITY ASSURANCE**

- A. Obtain an independent testing laboratory approved by the Owner to provide quality control testing.
- B. Material Testing Requirements
  - 1. Source Testing of Soils and Aggregate:
    - a. Test all select soils and aggregates for acceptance as required by other Sections within these Specifications.
  - 2. Installation Testing
    - a. Determine maximum density and optimum moisture content for compaction in accordance with ASTM D1557 (one test for each type of material for each source).
    - b. Conduct field density tests in accordance with ASTM D1556 and/or D6938.
    - c. Minimum frequency for field density testing shall be two (2) acceptable tests per layer per project or as follows, whichever number is greater:



Fill utilized for:	Number of Acceptable Tests for each Compacted Fill Layer:
Embankments, dikes or berms	1 test per 100 Linear Feet
Structural or controlled fills	1 test per 500 Linear Feet
Non-structural fills	1 test per 2,000 cubic yards

3. Provide Additional Density and Gradation Testing:
  - a. Change in method of compaction.
  - b. Change in source or quality of soil or aggregate.
  - c. Disturbed cut areas.
- C. When the testing results show that the Work is of an acceptable nature, the acceptance of the work shall not relieve the Contractor from making corrections to the tested work during the warranty period.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Topsoil
  1. Natural on-site upper layer of soil consisting of loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils able to sustain plant life.
- B. Wetland Topsoil
  1. Material consisting of moist organic soil, including any existing wetland vegetation and seeds.
- C. Fill and Borrow
  1. Material consisting of satisfactory soil or a mixture of satisfactory soil, stone, gravel or other acceptable materials, of a character and quality satisfactory for the purpose intended. Material shall be free from sod, stumps, logs, and other perishable and deleterious matter.
  2. As a minimum, all soil shall meet the requirements of Soil Class G-1 in accordance to the appropriate Specification Section.
- D. Embankments
  1. For embankments that will function as temporary or permanent water impoundments for ponds or small dams, the following shall apply:

- a) Satisfactory soil materials are those complying with ASTM D2487 soil classification groups GC, GM, SC, SM, CL, ML, CH, and MH; or as determined by Engineer.
- b) Unsatisfactory soil materials are those complying with ASTM D2487 soil classification groups GW, GP, SW, SP, OL, OH, and PT; or as determined by Engineer.

## **PART 3 - EXECUTION**

### **3.01 SITE PREPARATION**

- A. Provide erosion and sediment control prior to excavation in accordance to the appropriate Specification Sections and Drawings.
- B. Clear and grub as in accordance to the appropriate Specification Sections and shown on the Drawing.
- C. Remove and dispose of site debris.
  - 1. All debris materials removed from the project site shall be disposed of at a legally approved site.
  - 2. Do not burn materials onsite.
- D. Excavate wetland topsoil material from areas shown on the Drawings, stockpile and protect from contamination of other soils. Handle material in compliance with associated permits / permitting authorities / regulatory agencies.
- E. Remove structures, pavement and debris (such as vehicles, equipment, appliances, building materials or remains thereof, tires, and containers) from the site to an off-site disposal area selected by the Contractor in accordance with appropriate Specification Sections.

### **3.02 EXCAVATION AND FILL**

- A. Topsoil Stripping
  - 1. Segregate and stockpile stripped and/or excavated soils for use on the site as intended and stated on the Drawings.
  - 2. Excavate/strip and stockpile topsoil within the project limits shown on the Drawings prior to beginning excavating, fill or hauling operation.
  - 3. Provide excavating/stripping of topsoil in a manner that will minimize sediment runoff and not obstruct natural or intended drainage.
  - 4. Do not strip topsoil when wet.

5. Do not mix topsoil with subsoils.

B. Stockpiling

1. Stockpiles shall not exceed ten (10) feet in height.
2. Protect stockpiles from sediment transport by surface roughening, watering, and perimeter silt fencing and in accordance with appropriate Specification Sections.
3. Provide temporary seeding of stockpiles remaining longer than 30 days in accordance to appropriate Specifications Sections.

C. Excavation

1. Following clearing and grubbing, miscellaneous structure and debris removal, topsoil stripping, etc., excavate to finished subgrade (undisturbed soil or compacted soil layer) elevations shown on the Drawings.
2. Place suitable excavated material in fill areas to finished subgrade elevations shown on the Drawings.
3. Over excavate and remove unsuitable materials in areas requiring pavement and other structures including the following materials:
  - a. Frozen materials.
  - b. Materials subject to decomposition.
  - c. Clods of clay and stones larger than 3 inches.
  - d. Organic material including silts.
  - e. Soils with excessive moisture content.
4. Soils with excessive moisture content required to support pavement and other structure may not need to be removed if improvement by compaction, disking, drying and recompaction, or similar methods that when tested will meet optimum moisture content for compaction in accordance to appropriate Specification Sections.

D. Filling

1. Provide suitable excavated material that will meet compaction requirements in fill areas where pavements and other structures are shown on the Drawings.
2. Begin filling operations starting at the lowest point of the fill, below the grade at the bottom of ravines, etc.

3. Spread fill material in successive uniform horizontal layers not exceeding 8 inches in depth over entire fill area before compaction.
  - a. Work each layer to break down clods over 6 inches in size and to secure uniform moisture content.
  - b. Where filling in 8 inches is not feasible, as in the case of filling in water or over steep slopes, construct fill in one layer to the minimum elevation at which equipment can be operated.
    - (1) Construct fill layers above this elevation in layers of the specified depth.
    - (2) On side of hills, too steep to operate hauling equipment, over low wet ground, in marshes, or if filling in water, provide a single layer, just thick enough to support the hauling equipment while placing subsequent layers.
  - c. For embankments spread individual layers evenly to uniform thickness throughout and approximately parallel with the finished grade for the full width of the embankment.

E. Grading

1. Provide finish grade subgrade foundation within following tolerances:
  - a. When subgrade is prepared for placement of Granular Subbase or finished grading construction outside pavement areas, then elevation of finished surface shall not vary by more than 0.10 foot from prescribed elevation.
  - b. When subgrade is prepared for placement of Crushed Aggregate Base Course, then elevation of finished surface, at time the next layer is placed, shall not vary by more than 0.05 foot above or 0.10 foot below prescribed elevation.
  - c. When subgrade is prepared for placement of Asphaltic or Concrete Base, Stabilized Base, or Surface Course, then elevation of finished surface at time next layer is placed, shall not vary by more than 0.05 foot from prescribed elevation.
2. Subgrade Intermediate Consolidation and Trimming
  - a. Provide temporary drainage and efficient management of surface water.
    - (1) At the end of each workday, consolidate and trim the subgrade to aid drainage and to protect against erosion.

- (2) Consolidate and trim those portions of the subgrade surface disturbed, operated over, or constructed during that workday.
  - (3) Consolidate and trim until float material is pressed firmly against the subgrade and produces a tight, smooth, well-drained surface.
  - (4) If rain is imminent during the workday, consolidate and trim the subgrade before the rain falls to avoid ponding and erosion.
- b. No compensation will be provided for methods necessary to dry materials that have excessive moisture added due to surface water.
3. In lawn or unpaved areas foundations, finish areas to receive topsoil to within not more than 0.10 feet above or below required subgrade elevations.
4. In walkway foundation, shape surface of areas under walks with finish surface not more than 0.05 feet above or below required subgrade elevation.
5. In excavated slopes or areas and embankment slopes or areas designated to be covered with topsoil or salvaged topsoil, undercut or underfilled to the necessary depth to provide for the specified amount of topsoil or salvaged topsoil to be placed and finished to the required grade lines and sections.
6. Upon completion of finish grading in sloped areas with tracked equipment, provide a last pass to leave track mark imprints that are perpendicular to the direction of runoff flow. Blade work is not required during directional tracking.

F. Compaction and Moisture Requirements

1. Degree of compaction is expressed as a percentage of maximum density obtained by laboratory test procedure. This percentage of maximum density is provided from results of field test procedures in accordance to ASTM D1556.
2. Compact material using standard compaction methods unless the contract specifies special compaction.
  - a) Deposit, spread, and level material in layers generally no thicker than 8 inches before compaction. Compact each layer of material until the compaction equipment achieves no further significant

consolidation. Provide the required compaction for each layer before placing any material for a succeeding layer.

- b) Do not compact material if the moisture content causes excessive rutting by the hauling equipment, or excessive displacement or distortion under the compacting equipment. If these conditions exist, allow the materials to dry before compacting. If necessary, accelerate drying the materials by aerating or by using blade graders, harrows, discs, or other appropriate equipment to manipulate the material.
  - c) If the material does not contain sufficient moisture to compact properly, add water in quantities the engineer deems necessary to aid, accelerate, and secure effective compaction.
  - d) All embankment material placed within the limits of assumed one to one slopes extending outward and downward from the outer limits of the finished shoulder lines or back of curb shall be compacted in accordance with these specifications.
- 3. Compaction is required to a minimum of 95% of maximum dry density as determined by AASHTO Method T99 (Standard Proctor) will be required.
  - 4. Embankments Used for Impoundments:
    - a. The compaction requirements for the full width and depth of all embankments that will function as temporary or permanent water impoundments for ponds or dams shall meet a minimum of 95% of maximum dry density as determined by AASHTO Method T99.
  - 5. Maintain proper soil moisture contents for compaction in accordance to optimum moisture content as determined by ASTM D1557. Use Proctor to determine acceptance moisture contents for soil compaction.

G. Topsoil Placement / Re-spread

- 1. Place topsoil within the areas indicated on the Drawings. Place in a manner and thickness in accordance to applicable Specification Sections.

### **3.03 EXCESS MATERIAL**

A. Disposal:

- 1. The Owner reserves the right to specify dump site on abutting land or Owner can designate an area. If the Owner does not specify an area, Contractor has final responsibilities.
- 2. Is considered incidental to pipe installation.

- B. Disposal of Surplus Excavated Material includes:
1. Remove surplus excavated material from the site as soon as it is determined it will not be used for backfill material.
  2. Dispose of pavement separately from soils material.
  3. Dispose of surplus material which includes:
    - a. Loading and hauling.
    - b. Dumping and leveling.
    - c. Providing a dump site (when not specified by Owner).
      - (1) Conform with governing authorities including the obtaining of required permits.
      - (2) No limit on haul distance.
  4. Do not dispose of excavated surplus material in state waters, floodplain, or wetlands without written approval of the appropriate regulatory agency.

**END OF SECTION**

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**SECTION 31 23 33  
TRENCHING AND BACKFILL**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Trenching and Backfill
  - 2. Dewatering
  - 3. Compaction
  - 4. Materials Testing
  - 5. Excess Material
- B. This section applies to below ground pressure and gravity pipe lines.

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - ASTM D698                      Laboratory Compaction Characteristics of Soil Using Standard Effort
  - ASTM D1556                    Density and Unit Weight of Soil in Place by the Sand-Cone Method
  - ASTM D1586                    Standard Method for Penetration Test and Split-Barrel Sampling of Soils
  - ASTM D2321                    Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Application
  - ASTM D2922                    Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- B. American Association of State Highway and Transportation Officials (AASHTO):
  - AASHTO Method T99            The Moisture Density Relationship of Soils Using a 5.5 lb Hammer and a 12-Inch Drop (Standard Proctor)
  - AASHTO Method T191           Density of Soil in place by the Sand-Cone Method
  - AASHTO Method T310           In-Place Density and Moisture Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth)

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Informational Submittals: Submit two (2) copies of the results of quality control testing (include location where test was performed for each result):
  - 1. Materials source testing.
  - 2. Background testing
  - 3. Installation testing.
  - 4. Results of density testing.

### **1.05 QUALITY ASSURANCE**

- A. Testing Requirements:
  - 1. Unless covered under the “Allowances” section, Contractor shall pay for soil sampling and testing by a qualified testing agency, acceptable to Owner and independent of Contractor. Contractor is responsible for any retests and sampling required should initial tests fail, at no additional expense to Owner.
    - a. Conditions causing additional testing and gradation testing (retests):
      - (1) Soil density does not meet project requirements
      - (2) Change in method of compaction
      - (3) Change in source or quality of bedding or backfill material
  - 2. Test soil materials for suitability for intended purpose. Determine mechanical analysis, liquid and plastic limit, and moisture-density curve (ASTM D698/AASHTO T99) for each type of soil encountered. Test in accordance with standard recognized procedures.
    - a. Perform at least two field density tests in random compacted backfill layers for every 400 linear feet of trench, or fraction thereof.

3. Density tests shall be at randomly selected locations and in accordance with ASTM D1556/AASHTO T191 or ASTM D2922/AASHTO T310.
4. Forward all test results to Engineer prior to Contractor receiving payment for related Work.
5. Acceptable test results do not relieve the Contractor from making corrections to the tested work during the warranty period.

## **PART 2 - PRODUCTS**

### **2.01 NATIVE BACKFILL MATERIAL**

- A. Unless otherwise specified, use excavated material as backfill material. Use excavated material consisting of materials that, in the judgement of the Engineer, are suitable for backfilling.
- B. Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble, or soil with less than required bearing capacity as determined by Engineer are unsuitable materials.
- C. Backfill material shall be free of:
  1. Vegetable or other organic material.
  2. Concrete or concrete fragments.
  3. Stones larger than 3 inches.
  4. Frozen material.
  5. Blasted rock.

### **2.02 GRANULAR BEDDING**

- A. Crushed Stone Bedding
  1. Provide ¾" crushed rock bedding material of Soil Class A-7 in accordance to the appropriate Specification Section.

### **2.03 GRANULAR BACKFILL (SELECT BACKFILL MATERIAL)**

- A. Provide granular backfill material in accordance to the appropriate Specification Section.

## **PART 3 - EXECUTION**

### **3.01 EXISTING STRUCTURES AND UTILITIES**

- A. Existing Underground Improvements:
  - 1. Location and size of existing underground improvements, including pipes, wires, culverts, and conduits, are shown on Drawings insofar as records are available or surface markings indicate.
  - 2. Prior to trenching, determine the exact location of underground structures and coordinate location with the owner(s) of the structures/utilities.
- B. Remove concrete or asphalt surfaced walks and pavements, trees and other site improvements in accordance with appropriate Specification Sections.
- C. Unknown Underground Structure:
  - 1. When unknown existing underground structure occupies space required for proposed utility, Contractor shall immediately notify Engineer.
  - 2. If change in location of proposed improvement is required, then Contractor shall arrange for all relocations.
- D. Underground structures or utilities that do not occupy space required for proposed utility, but are relocated for convenience of Contractor shall be paid for by Contractor.
- E. When proposed utility is installed below an existing structure, backfill area with granular fill and mechanically compact fill, in layers not to exceed 6 inches in depth, to 95% of standard proctor.

### **3.02 TRENCHING**

- A. Remove and salvage topsoil in accordance to the appropriate Specification Sections.
- B. During trenching for new pipe or structures, remove existing pipe located in the same location or above the new pipe intended to replace existing pipe.
- C. Trench size shall be of adequate width and depth to allow proper construction of proposed utilities.
- D. Keep loss of pavement to a minimum within improved streets.
- E. Width of excavation below top of pipe shall be no more than 2 feet wider than outside diameter of pipe; except, minimum trench width shall be 30 inches.
- F. Excavate bell holes large enough to eliminate any excessive pressure on the bell.

- G. Unauthorized Over Excavation: Excavation below required level will be backfilled at Contractor's expense with suitable material and compacted to density of the undisturbed soil.
- H. Backfill Timing:
  - 1. Not more than 100 feet of trench is to be open in advance of pipe laying unless otherwise permitted by Engineer.
  - 2. In all cases, backfilling must occur within 200 feet of completed pipe laying.
- I. No compensation will be allowed for methods necessary to dry materials that have excessive moisture added due to surface water.

### **3.03 FOUNDATION**

- A. Prepare a uniform foundation for pipe.
- B. Unstable Foundation:
  - 1. Remove and replace all undesirable material encountered below the trench bottom, such as organic soils, etc., which cannot adequately support the proposed pipe.
  - 2. Contact Engineer when unstable foundation material is encountered.

### **3.04 BEDDING**

- A. Deposit all bedding material uniformly and simultaneously on each side of pipe to prevent lateral displacement.
- B. Plastic Pipe:
  - 1. Use granular bedding materials for all plastic pipe.
  - 2. Provide bedding as shown on Drawings, pipe embedment details.
  - 3. Uniformly compact material under and around pipe.
  - 4. Shape bottom of bedding to fit contour of pipe.
- C. RCP and DIP
  - 1. Bed pipe in carefully placed material on trench bottom as shown on the Drawings.

### **3.05 BACKFILL**

- A. Provide pipe bedding as required for the type of pipe installed per pipe embedment details as shown on plans.
- B. Place backfill material in maximum 12 inch lifts.
- C. Backfill material not to include: debris, frozen material, large clods or stones, organic matter, or other unstable materials.
- D. Place backfill in such a manner that will not disturb alignment of pipe.

### **3.06 TRENCH COMPACTION**

- A. Mechanical Compaction:
  - 1. Use mechanical compaction to compact backfill in trenches in 12 inch layers from one foot above top of pipe to finished grade to minimum density of 95% Standard Proctor.
- B. Areas Required: Mechanical compaction will be required for all trenches.
- C. Backfill trench to last pipe joint (not to exceed 10 feet) at the end of each work day.

### **3.07 ROCK EXCAVATION**

- A. Rock material that is igneous, metamorphic, or sedimentary rock or stone geologically in place and boulders over one cubic yard in volume in trenches that cannot be removed using a hydraulic backhoe or power shovel and therefore requires use of pneumatic breakers, rock trenchers or drilling and blasting for removal will be considered rock excavation as determined by the Engineer.
- B. Contact the Engineer when rock is believed to be encountered. The Engineer will determine whether the material is rock.
- C. Remove rock to a minimum of 6 inches below the bottom of pipe or excavation elevation and replaced with suitable material properly compacted.
  - 1. The thickness of the granular bedding material, granular fill material, or earth cushion shall be 6 inch minimum.
  - 2. Prepare the trench or excavation subgrade satisfactorily with hand tools and portable compaction equipment.
  - 3. In rock excavation, the bottom of the trench shall not be less than 30 inches wide or greater than 18 inches wider than the outside diameter of the pipe.

- D. Remove rock using methods other than drilling and blasting such as pneumatic breakers and rock trenchers.

### **3.08 DEWATERING TRENCHES**

- A. Determine groundwater conditions.
- B. Provide and maintain necessary means and methods to dewater excavation as required.
- C. Dispose of water.
- D. Prevent runoff and dewatering system discharge from entering excavation.
- E. Secure permits from regulatory and governmental agencies governing dewatering.
  - 1. If it becomes necessary to pump more than 70 gpm, then wells will be considered High Capacity Wells and shall be subject to WDNR approval as described in NR812.12 Wisconsin Administrative Code.
  - 2. Should High Capacity Wells be necessary, Contractor shall obtain appropriate permits from DNR at following location: Wisconsin Dept. of Natural Resources, Private Water Supply Section, PO Box 7921, Madison, WI 53707.
- F. Correct damage caused to private wells due to dewatering.
- G. Maintain a water supply to private and public wells affected by the dewatering operation.
- H. Dewater to a minimum depth of 12 inches below excavations.
- I. Maintain dewatering operation until backfill and compaction procedures are completed.
- J. Groundwater Disposal
  - 1. Convey groundwater to point of discharge through pipelines.
    - a. Open ditches and trenches are not permitted.
    - b. Use of Owner's utilities not permitted without written consent.

### **3.09 SHEATHING**

- A. General:
  - 1. Provide sheathing necessary to protect nearby facilities or pavement surface.

- B. Construction:
1. Prevent soil from entering trench either below or through such sheathing.
  2. Engineer may allow tight sheathing to be set in place rather than be driven; provided, that ground conditions are suitable and trench is properly spot braced prior to placing of sheathing.
  3. Immediately fill all voids behind sheathing with gravel backfill.
  4. Remove sheathing after trench is backfilled.
- C. Sheathing Left in Place:
1. Engineer may order, in writing, some or all of sheathing to remain in place.
  2. Upper portion within two feet of street surface cut off and removed.
  3. All voids left by the removal of the sheathing shall be carefully filled by appropriate measures.
- D. Minor bracing, shoring, or portable trench boxes will not be considered sheathing.

**END OF SECTION**



**SECTION 31 25 00**  
**EROSION AND SEDIMENTATION CONTROLS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Temporary Erosion and Sediment Controls
    - a. Temporary Grading Practices for Erosion Control
    - b. Temporary Seeding
    - c. Temporary Perimeter Control and Slope Products
    - d. Temporary Ditch Checks
    - e. Temporary Culvert Pipe Checks
    - f. Temporary Silt Fence
    - g. Temporary Storm Drain Inlet Protection
    - h. Temporary Stone Tracking Pads
    - i. Temporary Dust Control
    - j. Dewatering
  - 2. Permanent Erosion and Sediment Control
    - a. Permanent Seeding and Fertilizing
    - b. Permanent Erosion Mats
    - c. Vegetative Buffers
    - d. Mulching
    - e. Permanent Rip Rap
  - 3. Maintenance and Reporting

**1.02 REFERENCES**

- A. Wisconsin Department of Transportation (WisDOT)  
WisDOT Erosion Control, Product Acceptability Lists for Multi-Modal

Applications (PAL), latest edition.

B. American Society for Testing and Materials (ASTM)

ASTM D1388	Test Method for Stiffness of Fabrics
ASTM D2487	Test Method for Classification of Soils for Engineering Purposes
ASTM D3776	Test Method for Mass Per Unit Area (Weight) of Woven Fabric
ASTM D4355	Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D4491	Test Method for Water Permeability of Geotextiles by Permittivity
ASTM D4632	Test Method for Grab Breaking Load and Elongation of Geotextiles
ASTM D4751	Test Method for Determining Apparent Opening Size of a Geotextile
ASTM D4833	Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D5035	Test Method for Breaking Strength and Elongation of Textile Fabric (Strip Method)
ASTM D5338	Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions

C. Wisconsin Department of Natural Resources (WDNR)

Stormwater Technical Standards,  
<http://dnr.wi.gov/runoff/stormwater/techstds.htm>  
Best Management Practices  
Construction Site Inspection Report Form 3400-18

D. Local erosion control plans and ordinances.

### 1.03 SUBMITTALS

A. Action Submittals

1. Product Data
  - a. Provide product data showing listed on WisDOT PAL approval list.
  - b. Provide product data for manufactured products demonstrating conformance with the Specification.
2. Delegated Design Submittals
  - a. Provide plan for additional proposed erosion and sediment control.

- b. Provide rip rap design for severe erosion is anticipated.
- B. Informational Submittals
  - 1. Field or Site Quality Control Submittals
    - a. Submit weekly to Engineer one (1) copy of erosion control Construction Site Inspection Report(s).

## **PART 2 - PRODUCTS**

### **2.01 SEED**

- A. Temporary Seeding
  - 1. Provide seed species and application rates in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1059 "Seeding".
  - 2. Fertilizer is not required.
- B. Permanent Seeding
  - 1. Provide permanent seeding and fertilizer including vegetative buffers in accordance with the appropriate Specification Section.

### **2.02 TEMPORARY PERIMETER CONTROL AND SLOPE INTERRUPTION PRODUCTS**

- A. Provide perimeter control and slope interruption products in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1071 "Interim Manufactured Perimeter Control and Slope Interruption Products".
- B. Products shall be listed on WisDOT Erosion Control, Product Acceptability Lists for Multi-Modal Applications (PAL), latest edition for the appropriate application.

### **2.03 ROCK FILLED FILTER BAGS**

- A. Rock Filled Filter Bags
  - 1. Minimum unfilled size of 18" x 30".
  - 2. Construct bag of high-density polyethylene as manufactured by Erotex.
  - 3. Seal bag with a high-density polyethylene drawstring knitted directly into the bag opening in a rolled seam using minimum of 480 denier polyester sewing yarn.

4. Fill bag with well graded coarse aggregate conforming to Soil Class A-7 in accordance to the appropriate Specification Section.

## 2.04 SILT FENCE

### A. Geotextile Fabric

1. Provide either woven or non-woven polyester, polypropylene, stabilized nylon, polyethylene or polyvinylidene chloride fabric.
2. Provide fabric with the minimum strength values in the weakest principal direction.
3. Non-woven fabric may be needle punched, heat bonded, resin bonded or combination thereof.
4. Fabric shall meet the following requirements:
  - a. If silty soils on-site then the following can be used:
    - (1) Grab Tensile Strength: ASTM D4632 101 lbs. (450 N)
    - (2) Apparent Opening Size: ASTM D4751 0.3 mm
    - (3) UV Resistance Strength Retained: ASTM D4355 70 at 500 Hours (%)
    - (4) Permittivity (per second): ASTM D4491 0.14
  - b. If sandy soils on-site then the following can be used:
    - (1) Grab Tensile Strength: ASTM D4632 101 lbs. (450 N)
    - (2) Apparent Opening Size: ASTM D4751 0.3 mm to 0.8 mm
    - (3) UV Resistance Strength Retained: ASTM D4355 70 at 500 Hours (%)
    - (4) Permittivity (per second): ASTM D4491 0.14

### B. Support Posts

1. Wood or steel construction minimum length 5 feet.
2. Wood posts - 2" x 2" or equivalent steel posts.

### C. Silt fence shall conform to the Wisconsin Department of Natural Resources Conservation Practice Standard #1056 "Silt Fence".

## **2.05 RIP RAP**

- A. Rip rap may be used for construction of permanent erosion control or temporary ditch checks, and sediment trap outlets.
- B. Provide as follows:
  - 1. Provide minimum thickness of 1.0 feet measured perpendicular to the base.
  - 2. More than 50 percent of stones shall weigh more than 50 lb.
  - 3. If severe erosion is anticipated, submit riprap design to the Engineer.
- C. Rip rap for permanent erosion control shall be in accordance to the appropriate Specification section.

## **2.06 STORM DRAIN INLET PROTECTION**

- A. Provide storm drain inlet protection materials in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1060 "Storm Drain Inlet Protection for Construction Sites".
- B. Products shall be listed on WisDOT Erosion Control, Product Acceptability Lists for Multi-Modal Applications (PAL), latest edition are acceptable for the appropriate application.

## **2.07 STONE TRACKING PADS**

- A. Provide 3" to 6" clear or washed stone aggregate.
- B. All material shall be retained on a 3-inch sieve.

## **2.08 EROSION MATS**

- A. Provide non-channel erosion mat products in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1052 "Non-Channel Erosion Mat".
- B. Provide channel erosion mats products in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1053 "Channel Erosion Mat".
- C. Products shall be listed on WisDOT Erosion Control, Product Acceptability Lists for Multi-Modal Applications (PAL), latest edition for the appropriate application.

- D. Netting
  - 1. Netting, if used, shall not exceed 15% of the total blanket weight.
  - 2. Bond the netting to the parent material to prevent separation for the life of the project (minimum two months).
- E. Provide 100% organic biodegradable netted products, including parent material, stitching, and netting.
- F. Anchoring Devices
  - 1. Anchoring and components for temporary erosion mats shall be completely biodegradable as determined by ASTM D5338.
  - 2. Materials shall be environmentally safe for soil and groundwater.
  - 3. Do not use petroleum based plastics or composites.
  - 4. Do not use materials which may present a hazard from splintering or spearing.
  - 5. Design anchors to hold a minimum of two months and be substantially degraded within four months during the summer (warm soil conditions).

## 2.09 MULCH

- A. Provide mulch materials in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1058 "Mulching for Construction Sites".
- B. Mulch Anchoring Devices
  - 1. Where netting is required use polypropylene plastic, or biodegradable netting
  - 2. Tackifiers
    - a. Latex Base
      - (1) Latex emulsion polymer by weight shall consist of:
      - (2) Styrene (%): 48
      - (3) Butadien (%): 50
      - (4) Additive (%): 2
      - (5) Percent Solids: 42 to 46

- (6) pH (as shipped): 8.5 to 10.0
- (7) Emulsion shall not be frozen at any time or exposed to sunlight for extended periods of time.
- b. Guar Gum
  - (1) Minimum of 95% guar gum by weight.
  - (2) Remaining weight shall consist of dispersing and cross-linking additives.
- c. Other Tackifiers
  - (1) Other tackifiers shall include the following, but not limited to:
    - i) Water soluble natural vegetable gums.
    - ii) Guar gums blended with gelling and hardening agents.
    - iii) Water soluble blend of hydrophobic polymers, viscosifiers, sticking aids, and other gums.

## **PART 3 - EXECUTION**

### **3.01 TEMPORARY EROSION AND SEDIMENT CONTROLS**

- A. General
  - 1. Provide temporary erosion and sediment controls as shown on Drawings and additional erosion and sediment controls as determined by Contractor to be required based on construction means and methods prior to start of excavation.
  - 2. Submit to Engineer proposed plan for additional erosion and sediment controls.
  - 3. Minimize disturbed areas.
  - 4. Place excavated trench material on the high side of the trench where appropriate.
  - 5. Locate soil stockpiles no closer than 25 feet of a roadway, wetland, or drainage control channel and control by covering the pile with tarpaulins, temporary seed and mulch or other suitable means, if the pile is exposed for 14 days or more.

6. When it is necessary to cross waterways, provide crossing structures for machinery.
  7. Repair, replace, and maintain erosion and sedimentation structures until vegetation is re-established or permanent structures installed.
  8. Remove temporary erosion control structures and accumulated sediment and/or debris when vegetation is established.
- B. Temporary Grading Practices for Erosion Control
1. Provide construction operations to minimize erosion and sediment transport during grading operations and other excavations.
  2. Provide grade practices in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1067 "Grading Practices for Erosion Control - Temporary".
- C. Temporary Seeding
1. Provide temporary seeding to disturbed exposed soil areas that will not be brought to final grade or on which land-disturbing activities will not be performed for a period greater than 30 days, and requires vegetative cover for less than one year.
  2. Provide temporary seeding in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1059 "Seeding".
- D. Temporary Perimeter Control and Slope Interruption Products
1. Provide perimeter control and slope interruption products, other than sediment bale barriers and silt fence covered elsewhere, to detain or slow the flow of sediment-laden sheet flow runoff from small areas of disturbed soil.
  2. Provide these products to reduce uninterrupted slope length to slow the velocity of runoff to retain transported sediment from disturbed areas.
  3. Provide perimeter control and slope interruption products in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1071 "Interim Manufactured Perimeter Control and Slope Interruption Products".
- E. Temporary Ditch Checks
1. Provide temporary ditch checks prior to working near or adjacent to swales, ditches, channels and other areas of concentrated flow.



2. Construct temporary ditch checks with rock filled filter bags, manufactured ditch check products or rip rap.
  3. Support with wood or steel posts.
  4. Periodically remove sediment to maintain effective function.
  5. Provide ditch checks in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1062 "Ditch Check (Channel)".
- F. Temporary Culvert Pipe Checks
1. Provide rock filled filter bags immediately after installing new culverts and before beginning earth-disturbing activities in areas drained by existing culverts.
  2. Place rock bags on the inlet end of the culvert only.
  3. Leave rock bags in place until slopes and ditches are stable and turf develops enough to make future erosion unlikely.
  4. Periodically remove sediment to maintain effective function.
- G. Temporary Silt Fence
1. Provide temporary silt fence around the construction site where sheet form of runoff is possible.
  2. Periodically remove sediment to maintain effective function.
  3. Provide silt fence in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1056 "Silt Fence".
- H. Temporary Storm Drain Inlet Protection
1. Provide storm drain inlet protection at inlets near the site where storm water could carry silt and sediment to the drain.
  2. Periodically remove sediment to maintain effective function.
  3. Provide storm drain inlet protection in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1060 "Storm Drain Inlet Protection for Construction Sites".
- I. Temporary Stone Tracking Pads
1. Provide stone gravel mats at site vehicle entrance and site exit locations to prevent tracking of soil on roads or other pavements.

2. Collect tracked soil and clean from paved roads near the construction site the same day it occurs.
3. Provide stone tracking pads in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1057 "Stone Tracking Pad and Tire Washing".

J. Temporary Dust Control

1. Provide dust control measures for construction activities including minimizing soil disturbance, applying mulch and establishing vegetation, water spraying, surface roughening, applying additives (polymers), spray-on tackifiers, chlorides, and barriers.
2. Provide dust control in accordance with the Wisconsin Department of Natural Resources Conservation Practice #1068 "Dust Control On Construction Sites".

K. Dewatering

1. Discharge trench water to filter barrier prior to release into a drainage way.
2. Provide a compartmented container, settling basin, filter, or other appropriate best management practice through which sediment-laden water is conveyed to trap and retain the sediment.
3. Remove sediment from water generated from dewatering activities in accordance with Wisconsin Department of Natural Resources Conservation Practice #1061 "Dewatering".

### **3.02 PERMANENT EROSION AND SEDIMENT CONTROL**

A. Permanent Seeding and Fertilizing

1. Provide in accordance to the appropriate Specification Sections.

B. Permanent Erosion Mats

1. Provide erosion mats to protect channels and slopes from erosion and act as turf reinforcement during and after the establishment of grass.
2. Site Preparation
  - a. Place seed and fertilizer prior to placing permanent erosion mat.
  - b. Seed and fertilizer may be placed after permanent erosion mat installation with Engineer's approval.

- c. Ground surface shall be smooth and compact.
- d. Remove all rocks, dirt clods, stumps, roots, grass clumps, trash and other obstructions from lying in direct contact with the soil surface and the erosion mat.

3. Installation:

- a. Refer to Drawings for anchor trench (at ends, checks and edges) installation procedures.
- b. Anchor trenches shall be 12" deep.
- c. Compact anchor trench backfill.
- d. Place staples in end and check trenches spaced at 12 inches.
- e. Provide in accordance with manufacturer's recommendations.
- f. Roll width overlaps shall be 12" at edges. Pin or staple every 3 feet along overlap length.
- g. Splice roll end overlaps by overlapping (in the direction of water flow) two feet with the upstream portion of the mat on top of the downstream portion. This overlap shall receive at least three pins or staples with a maximum spacing of 12".
- h. Pins or staples shall be 18" in length minimum driven flush with the mat.
- i. Place mat flat conforming to contours in soil surface. Do not stretch mat.
- j. Place mat from toe of slope toward top of slope.

4. Provide non-channel erosion mat in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1052 "Non-Channel Erosion Mat".

5. Provide channel erosion mats in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1053 "Channel Erosion Mat".

C. Vegetative Buffers

- 1. Provide minimum 25-foot wide dense vegetation in areas where sediment delivery is in the form of sheet and rill erosion from disturbed areas.

2. Locate the vegetative buffer along the entire length of the down slope edge of the entire disturbed area.
3. Provide vegetative buffers in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1054 "Vegetative Buffer for Construction Sites".

D. Mulching

1. Provide mulching on exposed soils in conjunction with temporary or permanent seeding.
2. Anchoring Mulch
  - a. In areas establishing lawn type turf, use of tackifiers as the anchoring method.
  - b. In areas of temporary seeding, provide crimping to anchor the mulch.
  - c. In areas between a roadway curb and the property line, provide netting to anchor the mulch.
3. Provide mulching in accordance with the Wisconsin Department of Natural Resources Conservation Practice Standard #1058 "Mulching for Construction Sites".

E. Permanent Rip Rap

1. Provide rip rap in accordance to the appropriate Specification Sections.

### 3.03 MAINTENANCE

- A. Provide inspections of the construction site and implemented erosion and sediment control WDNR best management practices (BMPs) performed weekly and within 24 hours after a rainfall event of 0.5 inches or greater and rapid snow melt conditions.
1. Make any required repairs immediately.
  2. Maintain temporary erosion and sedimentation control structures until permanent soil erosion controls are completed and/or vegetation is established.
    - a. Repair damaged structures.
    - b. Replace lost structures.

3. Regularly remove sediment from deposition areas adjacent to erosion control structures without damaging structures.
  4. Refill eroded areas as required for grade stabilization.
- B. If the fabric on a silt fence or filter barrier decomposes or becomes ineffective prior to the end of the expected usable life and the barrier is still be necessary, replace the fabric promptly.
  - C. Remove sediment deposits after each major storm event and when deposits reach approximately one-half the height of the barrier.
  - D. Remove any sediment deposits remaining in place after the silt fence or filter barrier is no longer required and dress to conform with the existing grade, prepared and seeded.
  - E. Repair/restore any washed out areas.
  - F. Maintenance period to be entire project period including the one-year Correction Period.
  - G. Owner may direct Contractor to remove the temporary erosion control measures any time during the one-year Correction Period.
  - H. Construct permanent erosion control measures immediately after earthwork is completed.

### **3.04 ATTACHMENT**

- A. Construction Site Inspection Form.

**END OF SECTION**

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**Notice:** This form was developed in accordance with s. NR 216.48 Wis. Adm. Code for WPDES permittees' convenience; however, use of this specific form is voluntary. Multiple copies of this form may be made to compile the inspection report. Inspections of the construction site and implemented erosion and sediment control best management practices (BMPs) must be performed weekly and within 24 hours after a rainfall event 0.5 inches or greater.

<b>Construction Site Name and Location (Project, Municipality, and County):</b>		<b>Site/Facility ID No. (FIN):</b>	
<b>Onsite Contact/Contractor:</b>		<b>Onsite Phone/Cell:</b>	
<b>Note: Inspection reports, along with erosion control and storm water management plans, are required to be maintained on site in accordance with s. NR 216.48 (4) and made available upon request. PLEASE PRINT LEGIBLY.</b>			
<b>Date of inspection:</b>	<b>Time of inspection:</b> Start: _____ am <input type="radio"/> pm End: _____ am <input type="radio"/> pm	<b>Type of inspection:</b> <input type="radio"/> Weekly <input type="radio"/> Precipitation Event <input type="radio"/> Other (specify)	
<b>Weather/Site Conditions:</b> Temp. _____ °F Antecedent <input type="radio"/> Dry <input type="radio"/> Frozen or snow covered Soil Moisture <input type="radio"/> Variable <input type="radio"/> Frozen (Thaw predicted in next week) <input type="radio"/> Wet <input type="radio"/> Melting Snow/slush	<b>Describe current phase of construction:</b>		
<b>Last Rainfall Depth:</b> _____ inches	<b>Scheduled Final Stabilization Date for Universal Soil Loss Equation (USLE) <sup>1</sup>:</b>		
<b>Last Rainfall Date:</b> _____	<b>Project on Schedule? <input type="radio"/> Yes <input type="radio"/> No</b>		
<b>Name(s) of individual(s) performing inspection:</b>		<b>Inspector Phone/Cell:</b>	
I certify that the information contained on this form is an accurate assessment of site conditions at the time of inspection:			
<b>Inspector Signature</b>		<b>Date:</b>	
<b>Inspection Questions:</b>	<b>Yes</b>	<b>No (Identify Actions Required):</b>	<b>Location/Comments:</b>
1. Is the erosion control plan accessible to operators?	<input type="checkbox"/>	<input type="checkbox"/> Provide onsite copy	
2. Is the permit certificate posted where visible?	<input type="checkbox"/>	<input type="checkbox"/> Post certificate	
3. Is the current phase of construction on sequence with the site-specific erosion and sediment control plan, including installation/stabilization of ponds and ditches?	<input type="checkbox"/>	<input type="checkbox"/> Add sediment control <input type="checkbox"/> Install missing ditch/pipe/pond <input type="checkbox"/> Stabilize bare soil	
4. Are all erosion and sediment control BMPs shown on plan properly installed and in functional condition?	<input type="checkbox"/>	<input type="checkbox"/> Repair <input type="checkbox"/> Modify <input type="checkbox"/> Install/Replace	
5. Is inlet protection properly installed and functioning in all inlets likely to receive runoff from the site?	<input type="checkbox"/>	<input type="checkbox"/> Clean <input type="checkbox"/> Replace <input type="checkbox"/> Install	
6. Is the air free of fugitive dust resulting from construction activity and bare soil exposure?	<input type="checkbox"/>	<input type="checkbox"/> Apply water <input type="checkbox"/> Apply dust control product	
<b>Actions Completed by Date &amp; Initials</b>			

<sup>1</sup> The Universal Soil Loss Equation (USLE) model and the Construction Site Soil Loss and Sediment Discharge Guidance are available at: [http://dnr.wi.gov/topic/stormwater/standards/const\\_standards.html](http://dnr.wi.gov/topic/stormwater/standards/const_standards.html)

Inspection Questions:	Yes	No (Identify Actions Required):	Location/Comments:	Actions Completed by Date & Initials
7. Is the public right of way curb line free of tracked soil and accumulation?	<input type="checkbox"/>	<input type="checkbox"/> Install tracking pad <input type="checkbox"/> Widen/lengthen pad <input type="checkbox"/> Amend stone/Add geotextile <input type="checkbox"/> Install wheel washing station <input type="checkbox"/> Close entrance/exit <input type="checkbox"/> Limit traffic across disturbed areas <input type="checkbox"/> Sweep road and curb line		
8. Are wetlands, lakes, streams, ditches, or storm sewers downstream of the site free of sedimentation and turbid water leaving the site? <sup>3</sup>	<input type="checkbox"/>	<input type="checkbox"/> Repair/Replace erosion control <input type="checkbox"/> Add sediment controls <input type="checkbox"/> Modify operations <input type="checkbox"/> Contact DNR to verify extent of cleanup required		
9. Is dewatering and/or vehicle and equipment washing being done in a manner that prevents erosion and sediment discharge?	<input type="checkbox"/>	<input type="checkbox"/> Install treatment train <input type="checkbox"/> Install energy dissipation <input type="checkbox"/> Modify discharge location <input type="checkbox"/> Modify intake to reduce sediment		
10. Are soil stockpiles existing for more than 7 days covered and stabilized?	<input type="checkbox"/>	<input type="checkbox"/> Seed <input type="checkbox"/> Install mat/mulch/polymer <input type="checkbox"/> Cover with tarp/plastic sheeting		
11. Are downstream channels and other downhill areas protected from scour and erosion?	<input type="checkbox"/>	<input type="checkbox"/> Install energy dissipation at outfall <input type="checkbox"/> Install ditch checks <input type="checkbox"/> Install slope interruption <input type="checkbox"/> Install onsite detention		
12. Are good housekeeping practices or treatment controls in place to prevent the discharge of chemicals, cement, trash, and other materials into wetlands, waterways, storm sewers, ditches, or drainage-ways? <sup>4</sup>	<input type="checkbox"/>	<input type="checkbox"/> Properly dispose of trash <input type="checkbox"/> Provide concrete washout station <input type="checkbox"/> Contact DNR to verify extent of cleanup required		
13. Is the plan reflective of current site operations and does it address all erosion and sediment control issues identified during the inspection?	<input type="checkbox"/>	<input type="checkbox"/> Revise sequence <input type="checkbox"/> Revise sediment control BMP <input type="checkbox"/> Revise erosion control BMP <input type="checkbox"/> Revise post-construction storm water BMP		
14. Are all areas where construction has temporarily ceased (and will not resume for more than 2 weeks) temporarily stabilized?	<input type="checkbox"/>	<input type="checkbox"/> Topsoil & seed <input type="checkbox"/> Install mat/mulch/polymer <input type="checkbox"/> Cover with tarp/plastic sheeting		
15. Are all areas at final grade permanently vegetated or stabilized with other treatments?	<input type="checkbox"/>	<input type="checkbox"/> Topsoil & seed <input type="checkbox"/> Install mat/mulch/polymer <input type="checkbox"/> Sod <input type="checkbox"/> Install stone base		
16. Have temporary sediment controls been removed in areas of the site that meet the permit definition of 'final stabilization'?	<input type="checkbox"/>	<input type="checkbox"/> Water to establish vegetation <input type="checkbox"/> Repair or reseed areas <input type="checkbox"/> Remove temporary practices		

<sup>3</sup> If sediment discharge enters a wetland or waterbody, the permittee should consult with DNR staff to determine if sediment cleanup and/or additional control measures are required.

<sup>4</sup> The permittee shall notify the DNR immediately via the spills hotline at (800)943-0003 of any release or spill of a hazardous substance to the environment in accordance with s. 292.11, Wis. Stats., and ch. NR 706, Wis. Adm. Code.



**SECTION 31 34 19**  
**GEOSYNTHETIC SOIL REINFORCEMENT**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
1. Woven and Non-Woven Geotextile Fabrics
  2. Geogrid

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
- |            |  |
|------------|--|
| ASTM D123  | Standard Terminology Relating to Textiles  |
| ASTM D1388 | Standard Test Methods for Stiffness of Fabrics   |
| ASTM D4354 | Standard Practice for Sampling Geotextiles for Testing   |
| ASTM D4491 | Standard Test Method for Water Permeability of Geotextiles by Permittivity   |
| ASTM D4533 | Standard Test Method for Trapezoid Tearing Strength of Geotextiles   |
| ASTM D4595 | Standard Test Method for Tensile Properties of Geotextiles by Wide-Width Strip Method  |
| ASTM D4632 | Standard Test Method for Grab Breaking Load and Elongation of Geotextiles  |
| ASTM D4751 | Standard Test Method for Determining Apparent Opening Size of Geotextiles  |
| ASTM D4759 | Standard Practice for Determining the Specification Conformance of Geosynthetics   |
| ASTM D4873 | Standard Guide for Identification, Storage and Handling of Geosynthetic Rolls  |
| ASTM D4884 | Standard Test Method of Strength of Sewn or Thermally Bonded Seams of Geotextiles  |
| ASTM D6241 | Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe           |
| ASTM D6637 | Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method                  |
| ASTM D7238 | Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus |
| ASTM D7737 | Standard Test Method for Individual Geogrid Junction Strength  |
| ASTM D7748 | Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles and Related Products                                       |

- B. Geosynthetics Research Institute (GRI)
  - GRI GG2 Geogrid Junction Strength
  - GRI GG9 Torsional Behavior of Bidirectional Geogrids When Subjected to In-Plane Rotation
  - GRI GT13(a) Test Methods and Properties for Geotextiles Used as Separation Between Subgrade Soils and Aggregate – ASTM Version
- C. American Association of State Highway and Transportation Officials (AASHTO):
  - AASHTO M288 Geotextile Specification for Highway Applications

### **1.03 SUBMITTALS**

- A. Informational
  - 1. Provide, prior to delivery of the Geosynthetic material, a manufacturer's Certificate of Compliance that the Geosynthetic material meets the requirements of this Section.
  - 2. Manufacturer's installation guide.
  - 3. Provide information tags from all rolls installed.

### **1.04 DELIVERY STORAGE AND HANDLING**

- A. All Geosynthetic materials shall be labeled, shipped, stored and handled in accordance with ASTM D4873.
- B. Do not use sharp instruments for handling geotextile.
- C. Do not leave geosynthetic materials directly exposed to sunlight for longer than manufacturer's recommended time.
- D. Store geotextile fabric in a dry location until installed.

## **PART 2 - PRODUCTS**

### **2.01 GEOTEXTILE FABRIC MATERIAL**

- A. General
  - 1. Provide geotextile fabric consisting of either woven or non-woven polyester, polypropylene, stabilized nylon, and polyethylene or polyvinylidene chloride.

- a. All fabric shall have the minimum strength values in the weakest principle direction.
  - b. Non-woven fabric may be needle punched, heat bonded, resin bonded or combinations thereof.
- 2. The geotextile fabric shall be insect, rodent, mildew and rot resistant.
  - 3. Clearly mark the geotextile fabric rolls showing the type of fabric.
  - 4. If sewn seams are used, provide a field sewn seam sample produced from the geotextile fabric and thread and with the equipment to be used on the project, prior to its incorporation into the work.

B. Nonwoven Geotextile Fabric, Type HR

- 1. Type HR non-woven geotextile fabric shall be used beneath medium (greater than 400 lb. stones) and heavy (greater than 650 lb. stone) riprap.
- 2. The fabric shall comply with the following physical properties:

<u>Test</u>	<u>Method</u>	<u>Value</u> <sup>(1)</sup>
Grab Tensile Strength (lbs.)	ASTM D4632	300 min.
Puncture Strength (lbs.)	ASTM D6241	100 min.
Grab Elongation (%)	ASTM D4632	15 min.
Permittivity, sec	ASTM D4491	0.30 min.

<sup>(1)</sup>All numerical values represent minimum/maximum average roll values (i.e., the average of minimum test results on any roll in a lot should meet or exceed the minimum specified values).

- 3. The following fabrics are approved for Type HR:
  - a. Carthage — FX-160HS
  - b. Contech — C120NW
  - c. Mirafi — 1120N

C. Nonwoven Geotextile Fabric, Type R, Rip Rap

- 1. Use Type R nonwoven geotextile fabric beneath light riprap (less than 400 lb. stone).
- 2. The fabric must comply with the following special physical properties.

<u>Test</u>	<u>Method</u>	<u>Value (1)</u>
Grab Tensile Strength (lbs.)	ASTM D4632	205 min.
Puncture Strength (lbs.)	ASTM D6241	80 min.
Apparent Opening Size (U.S. Standard Sieve)	ASTM D4751	30 max.
Permittivity, sec <sup>(1)</sup>	ASTM D4491	0.12 min.

<sup>(1)</sup> All numerical values represent minimum/maximum average roll values (i.e., the average of minimum test results on any roll in a lot should meet or exceed the minimum specified values).

3. The following non-woven fabrics are approved for Type R:
  - a. Nilex — 4553
  - b. Carthage — FX-80HS
  - c. Contech — C-200
  - d. Mirafi — 180N

D. Woven Geotextile Fabric, Type SR, Subgrade Reinforcement

1. Use woven geotextile fabric subgrade reinforcement beneath roadway subbase and structures to reinforce existing subgrade soils.
2. Ground stabilization fabrics shall consist of woven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride with the following requirements. Woven fabric shall have the minimum strength values in the weakest principle direction.
3. The fabric shall be insect, rodent, mildew and rot resistant.
4. The fabric shall comply with the following minimum physical requirements:

<u>Parameter</u>	<u>Method</u>	<u>Value</u>
Trapezoid Tear (lbs.)	ASTM D4533	100 lbs.
Permittivity (sec-1)	ASTM D4491	0.02
Apparent Opening Size (sieve size)	ASTM D4751	30/70
Ultraviolet Degradation (% strength retained)	ASTM D7238	70
Grab Tensile Strength (lbs.)	ASTM D4632-86	280 min.
Puncture Strength (lbs.)	ASTM D6241	115 min.
Mullen Burst (psi)	ASTM D3786	600 min.
Elongation at Required Strength (%)	ASTM D4632-86	25% max.

<sup>(1)</sup>All numerical values represent minimum/maximum average roll values (i.e., the average of test results on any roll in a lot should meet or exceed the minimum values in the table).

5. The following woven fabrics are approved for Type SR:
  - a. Amoco (Nilex) — 2006
  - b. Carthage Mills — FX-66
  - c. Contech — C300
  - d. Mirafi — 600X

E. Knitted, Woven or Non-Woven Geotextile Fabric, Type DP, Drainage Pipe/Underdrains

1. Use a geotextile of knitted, woven, or non-woven fibers of polypropylene, stabilized nylon, or polyethylene chloride. Do not use slit film woven fabrics for this application.
2. Use knitted fabric constructed from continuous yarn. Non-woven fabrics may be needle-punched, heat-bonded, resin-bonded, or combinations of the three types. Use woven fabrics constructed from monofilament yarns.
3. Use geotextile wraps of knitted construction that form a seamless sleeve and fit tightly over the pipe. If using geotextile wraps constructed from woven or non-woven fabric then tightly wrap and securely fix to the pipe.
4. Clearly mark the geotextile rolls to identify the type of fabric.
5. The fabric shall comply with the following minimum physical requirements:

<u>Test</u>	<u>Method</u>	<u>Value</u>
Minimum grab tensile strength	ASTM D4632	35 lbs.
Apparent Opening Size	ASTM D4751	No.30-200
Minimum permittivity	-----	1.35 s <sup>-1</sup>

All numerical values represent minimum/maximum average roll values (i.e., the average of test results on any roll in a lot should meet or exceed the minimum values in the table).

F. Non-woven geotextile fabrics, Type SAS, Soil Aggregate Separation:

1. Place nonwoven geotextile used shall be placed between subgrade soils and aggregates.
2. Nonwoven geotextile shall conform to GRI-GT13.
3. The geotextile fabric shall comply with the physical properties in Tables 2a, 2b or 2c and as shown on the Drawings.

**Table 2a. Geotextile Properties Class 1(High Survivability)**

<u>Property</u> <sup>(1)</sup>	ASTM		Elongation	
	<u>Test</u>	<u>Unit</u>	<u>&lt; 50%</u>	<u>≥ 50%</u>
Grab Tensile Strength	D4632	lb.	315	203
Trapezoid Tear Strength	D4533	lb.	112	79
CBR Puncture Strength	D6241	lb.	630	440
Permittivity	D4491	sec-1	0.02	0.02
Apparent Opening Size	D4751	in.	0.024	0.024
Ultraviolet Stability <sup>(2)</sup>	D7238	% Ret. At 500 hours	50	50

**Table 2b. Geotextile Properties Class 2 (Moderate Survivability)**

<u>Property</u> <sup>(1)</sup>	ASTM		Elongation	
	<u>Test</u>	<u>Unit</u>	<u>&lt;50%</u>	<u>≥50%</u>
Grab Tensile Strength	D4632	lb.	248	158
Trapezoid Tear Strength	D4533	lb.	90	56
CBR Puncture Strength	D6241	lb.	500	320
Permittivity	D4491	sec-1	0.02	0.02
Apparent Opening Size	D475 1	in.	0.024	0.024
Ultraviolet Stability <sup>(2)</sup>	D7238	% Ret. At 500 hours	50	50

**Table 2c. Geotextile Properties Class 3 (Low Survivability)**

<u>Property</u> <sup>(1)</sup>	ASTM		Elongation	
	<u>Test</u>	<u>Unit</u>	<u>&lt; 50%</u>	<u>≥ 50%</u>
Grab Tensile Strength	D4632	lb.	180	113
Trapezoid Tear Strength	D4533	lb.	68	41
CBR Puncture Strength	D6241	lb.	380	230
Permittivity	D4491	sec- I	0.02	0.02
Apparent Opening Size	D475 I	in.	0.024	0.024
Ultraviolet Stability <sup>(2)</sup>	D7238	% Ret. At 500 hours	50	50

<sup>(1)</sup> All values are minimum average roll values (MARV) except AOS, which is a maximum average roll value (MaxARV) and UV stability, which is a minimum average value.

<sup>(2)</sup> Evaluation to be on 50mm strip tensile specimens after 500 hours exposure.

## 2.02 GEOGRID MATERIAL

### A. General

1. Provide geogrid which is dimensionally stable and able to retain its geometry under construction stresses.

2. Provide geogrid that is resistant to damage during construction, ultraviolet degradation, and all forms of chemical and biological degradation encountered in the soil on which it is placed.
3. Provide geogrid that consists of either single or joined multiple layers of a uniform square or rectangular grid of bonded, formed or fused polymer tensile strands.
4. Provide polyester, polypropylene, polyamide, or polyethylene material that maintains dimensional stability during handling, placing, and installation.
5. Provide geogrid that is at least 6.0 feet wide.

**B. Geogrid-Single Layer Bi-axial, Type SR, Subgrade Reinforcement**

1. Use geogrid subgrade reinforcement beneath roadway subbase and structures to reinforce existing subgrade soils.
2. Geogrid shall comply with the following minimum physical requirements:

<u>TEST</u>	<u>METHOD</u>	<u>VALUE</u> <sup>(1)</sup>
Tensile Strength at 5% Strain (both principal directions in lb./ft.)	D6637	450 min
Flexural Rigidity (both principal directions in mg/cm)	D7748	150,000 min
Aperture Area (in <sup>2</sup> )	Inside Measurement <sup>(2)</sup>	5.0 max
Aperture Dimension (in)	Inside Measurement <sup>(2)</sup>	0.5 min

<sup>(1)</sup> All numerical values represent minimum/maximum average roll values. Average test results from all rolls in a lot must conform to the tabulated values.

<sup>(2)</sup> Aperture area and aperture dimension for joined multi-layer geogrids are determined based on measurement of a single layer of the geogrid.

3. The following single layer bi-axial geogrid are approved:
  - a. Propex - BaseGrid 11
  - b. Tensar - BX1100
  - c. Nilex - BX Type 1

**PART 3 - EXECUTION**

**3.01 GENERAL PREPARATION AND PLACEMENT**

**A. Geotextile Fabric**

1. Grade the area to be covered by the geotextile to a smooth, uniform condition, free from ruts, potholes, and protruding objects such as rocks or sticks. Do not allow traffic or construction equipment on the placed geotextile material. Dispose of material with defects, rips, holes, flaws, deterioration, or other damage. Do not use defective material in the work.
2. Spread the geotextile material immediately ahead of the covering operation. Lay geotextile material smooth without wrinkles or folds on the prepared subgrade in the direction of construction traffic. Remove wrinkles and folds by pulling geotextile material taut as required. Use the manufacturer's recommended method to hold geotextile material in place until the specified cover material is placed. Overlap geotextile materials a minimum of 2 feet. Overlap in the direction shown on the Drawings.
3. On curves, cut or fold geotextile material to conform to the curve. Fold or overlap in the direction of construction and hold in place using pins, staples, or piles of fill or rock.
4. Do not cover geotextile material until inspected for damage. Make repairs following the manufacturer's recommendation or use a patch of the same material placed over the damaged area, overlapped at least 3 feet from the edge of any part of the damage.
5. Place fill over geotextile material by dumping onto previously placed material and pushing the material into place. Do not operate any construction equipment directly on geotextile material under any circumstances. Place the fill material in uniform layers so that there is a minimum lift thickness (loose) of 8 inches between geotextile material and equipment tires or tracks at all times. The minimum thickness of the first lift is 8 inches. Do not allow construction equipment to turn on the first lift of material above geotextile material. Do not blade the first lift placed over geotextile material. Spread piles as soon as possible after dumping to minimize the potential for localized subgrade failure due to overloading of the subgrade.
6. Do not use sheepsfoot or studded compaction equipment on the first lift placed over geotextile material. Stop vibrator on compaction equipment if pumping occurs. Do not operate any construction equipment that results in rutting in excess of 3 inches on the first lift. If rutting exceeds 3 inches, decrease the construction equipment size and/or weight or increase the lift thickness. Use only rubber-tired rollers for compaction if any foundation failures occur when placing subsequent lifts. Compact all lifts to the moisture and density requirements for earth embankment required within these specifications. Do not blade material down to remove ruts. Fill any ruts or depressions with additional material and compact to the specified density.



## B. Geogrid

1. Place geogrid as the Drawings show or engineer directs. Pull flat and secure using pins, staples, or other devices to prevent movement or displacement. Lap butt joints between roll ends at least 12 inches unless the plans or special provisions specify otherwise. Overlap parallel strips at least 6 inches. Do not operate vehicles or construction equipment directly on geogrid.
2. Cover small rips, tears, or defects in the geogrid with an additional section of geogrid secured in place overlapping the damaged area by at least 3 feet in all directions. Remove and replace geogrid sections with large rips, tears, defects, or other damage as the engineer directs before backfilling.
3. After placement, backfill the geogrid to the depth and with the type of material the plans or specifications require. Place, spread, and compact backfill conforming to the standard spec or special provision requirements for that backfill material, except ensure that the initial lift over the geogrid is at least 4 inches deep. Do not cover the geogrid until inspected for damage. Make repairs following the manufacturer's recommendation or use a patch of the same material placed over the damaged area, overlapped at least 3 feet in all directions.
4. Place fill over the geogrid material by dumping onto previously placed material and pushing the material into place. Do not operate any construction equipment directly on the geogrid under any circumstances. Place the fill material in uniform layers so that there is a minimum lift thickness (loose) of 6 inches between the geogrid and equipment tires or tracks at all times. The minimum thickness of the first lift is 6 inches. Do not allow construction equipment to turn on the first lift of material above the geogrid material. Spread piles as soon as possible after dumping to minimize the potential for localized subgrade failure due to overloading of the subgrade
5. Do not displace or damage the geogrid during backfill operations. The engineer may direct the contractor to repair or replace damaged, displaced, or otherwise defective geogrid and may require equipment and operations changes to prevent further damage or displacement.

## 3.02 SEAMS

### A. Geotextile Fabric – Types HR, R, SR, SAS

1. Secure lapped section together using manufacturers approved methods and anchoring devices.

- B. Geogrid
  - 1. Secure lapped sections together using manufacturer approved ties, straps, clips, or other devices.

**3.03 NON-WOVEN GEOTEXTILE FABRIC - TYPES HR, R, F AND SR**

- A. Grade the area smooth and remove all stones, roots, sticks or other foreign material, which would interfere with the fabric being completely in contact with the soil.
- B. Place the fabric loosely and parallel to the direction of water movement.
  - 1. Provide pinning or stapling as recommended by manufacturer to hold the geotextile in place.
  - 2. Join separate pieces of fabric by overlapping or sewing according to Table 3.

**Table 3. Maximum Spacing for Securing Pins**

<u>Slope</u>	<u>Spacing (feet)</u>
Steeper than 3H to Lv	2
From 3H to IV to 4H to IV	3
Flatter than 4H to IV	5

- 3. Place the fabric in the overlapped joints with a minimum overlap of 24 inches in the direction of flow. After placement, do not expose the fabric longer than 48 hours prior to covering.
- C. Cover damaged areas with a patch of fabric using a 3-foot overlap in all directions. Place riprap from the base of the slope upward.
- D. Do not allow freefall of riprap to prevent damage to the fabric.

**3.04 WOVEN GEOTEXTILE FABRIC SUBGRADE REINFORCEMENT AND NONWOVEN GEOTEXTILE FABRIC**

- A. Prior to the placement of geotextile fabric, grade smoothed and shaped to the required grade and section. After the fabric has been placed, do not permit traffic or construction equipment to travel directly on the fabric.
- B. Roll out the fabric on the excavation and pull taut manually to remove wrinkles.
- C. Join separate pieces of fabric by overlapping or sewing as required by the manufacturer.

- D. Place the fabric in the overlapped joints with a minimum overlap of 24 inches.
- E. Provide weights or other methods to prevent lifting of the fabric by wind.

### **3.05 GEOTEXTILE PROTECTION**

- A. Protect the geotextile at all times during construction from contamination by surface runoff. Remove and replace any geotextile so contaminated with uncontaminated geotextile.
- B. Replace any damaged geotextile.
- C. Schedule the work so that the covering of the geotextile with a layer of the specified material is completed within seven (7) calendar days after placement of the geotextile.
- D. Protect the geotextile from damage prior to and during the placement of riprap or other materials.
  - 1. Limit the height of drop to less than 300 mm (1 foot), or place a cushioning layer of sand or gravel on top of the geotextile before placing the material, or other methods deemed necessary.
  - 2. Take care to ensure that the utilized cushioning materials do not impede the flow of water.
  - 3. Before placement of riprap or other materials, demonstrate that the proposed placement technique will not cause damage to the geotextile.
  - 4. Equipment is not allowed on the unprotected geotextile.

**END OF SECTION**

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**SECTION 31 37 00  
PERMANENT RIPRAP**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Placing riprap.
  - 2. Providing geotextile fabric.

**1.02 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

**PART 2 - PRODUCTS**

**2.01 MATERIALS**

- A. Riprap Stone
  - 1. Provide in accordance with the appropriate Specification Section.
- B. Geotextile
  - 1. Riprap shall be placed on a layer of geotextile fabric as indicated on the Drawings.
    - a. Light Riprap: The fabric shall be geotextile fabric, Type R (Riprap)
    - b. Medium, Heavy and Extra Heavy Riprap: The fabric shall be geotextile fabric, Type HR (Heavy Riprap).
  - 2. Provide geotextile materials in accordance to the appropriate Specification Section.

**PART 3 - EXECUTION**

**3.01 PREPARATION**

- A. Prepare the bed for the riprap by excavating, shaping the slopes, and constructing the toe for riprap installation.

- B. Install specified geotextile within prepared riprap bed area.

### **3.02 INSTALLATION**

#### **A. Placing Light Riprap**

1. Place by hand with larger stones in lower courses. Lay stones perpendicular to the slope with close, broken joints, firmly bed in the slope, and thoroughly compact. Chink spaces between stones to make the finished surface even and tight.
2. Unless specified otherwise, make riprap at least one foot thick, measured perpendicular to the slope.
3. Do not place riprap against, or in contact with, concrete surface before the end of the concrete's curing and protection period.

#### **B. Placing Medium, Heavy and Extra-Heavy Riprap**

1. Place medium, heavy, and extra-heavy riprap by any mechanical means, not dumping, that produce a completed job within reasonable tolerances of the typical section shown on the Drawings. Limit handwork to the quantity necessary to fill large voids or to correct segregated areas.

**END OF SECTION**

**SECTION 32 05 13**  
**SOILS FOR EXTERIOR IMPROVEMENTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Bank Run Soils
  - 2. Manufactured and Special Soils

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM C144 Spec. for Aggregate for Masonry Mortar
  - ASTM C207 Spec. for Hydrated Lime for Masonry Purposes
  - ASTM C602 Spec. for Agricultural Liming Materials
  - ASTM D75 Sampling Aggregates
  - ASTM D422 Particle Size Analysis of Soils
  - ASTM D1140 Test for Amount of Material in Soils Finer than the No. 200 Sieve
  - ASTM D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures
  - ASTM D2487 Classification of Soils for Engineering Purposes
  - ASTM D4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity of Soils
  - ASTM D5268 Standard Specification for Topsoil Used for Landscaping Purposes

**1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

**1.04 SUBMITTALS**

- A. Informational Submittals
  - 1. Test and Evaluation Reports
    - a. Provide test reports showing the results of required material testing.

- b. Provide topsoil analysis performed in accordance with ASTM D5268 and demonstrating the topsoil meets Soil Conservation Service specified soil types. Also, submit results of test for nutrient levels and provide recommendations for fertilizer type and application.

2. Field or Site Quality Control Submittals

- a. Daily delivery tickets for each load of material delivered to the site.

**1.05 QUALITY ASSURANCE**

- A. An independent testing laboratory approved by the Owner shall be obtained by the Contractor and provide quality control testing.

**PART 2 - PRODUCTS**

**2.01 BANK RUN SOILS**

- A. Soil Class D-1 and D-2 (Structure, Unstable Materials, Piping Removals, and Subgrade Improvement Backfill Material)
  - 1. Provide rounded or sub-angular virgin material of either sand-sized particles or sand-sized particles mixed with gravel, crushed gravel, or crushed stone resulting from pit run or crushed material.
  - 2. Materials shall be free from clay lumps, organic matter, and deleterious substances.
  - 3. One hundred percent by weight shall pass a 3-inch sieve and 25 to 100 percent shall pass the No. 4 sieve.
  - 4. Maximum liquid limit shall be 25 percent and maximum plasticity index equal to 6.
  - 5. No frozen material.
  - 6. The portion of material which passes a No. 4 sieve shall conform to the following gradation limits:

Maximum Percent Passing By Weight

<u>Sieve Size</u>	<u>Class D-1 Percent</u>	<u>Class D-2 Percent</u>
No. 4	100	100
No. 40	0 – 75	-----
No. 100	0 – 15	0 - 30
No. 200	0 – 8.0	0 – 15.0



B. Soil Class D-3 (Sand)

1. Well graded, unwashed bank run or crushed bank run which is free from clay lumps, organic matter, and other deleterious substances with gradation as follows:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
¾-inch	100
No. 4	90-100
No. 10	45-90
No. 40	15-45
No. 200	0-10

C. Soil Class E-1 (Clay)

1. Minimum 50 percent by weight passing the No. 200 sieve.
2. For the fraction passing the No. 40 sieve, the minimum plasticity index shall be 15.
3. Minimum Atterberg liquid limit of 30.
4. Free from organic material, boulders, cobbles, excessive amounts of gravel (greater than ¾-inch), and other deleterious substances.

D. Soil Class F-1 (Topsoil)

1. Topsoil shall meet the definition and specification stated in ASTM D5268 and meets one of the following SCS (Soil Conservation Service) soil textures:
  - a. Loam.
  - b. Sandy loam.
  - c. Silt loam.
  - d. Silty clay loam.
  - e. Clay loam.
2. The topsoil shall consist of adequate mineral content to support the growth of the intended vegetation and shall not contain herbicides that would be detrimental for the intended use.
3. The topsoil shall have adequate fertility for quick establishment of vegetation.
4. The pH of the topsoil shall be between 6.0 and 7.0.

5. Topsoil shall be free from deleterious substances.
  6. Pulverize and screen the topsoil such that 100 percent passes the 1-inch (25 mm) sieve and at least 90 percent passes the No. 10 (2.00 mm).
- E. Soils Class F-2 (Compost/Topsoil)
1. Same as Topsoil above except compost/topsoil defined as a mixture of topsoil and soil that is a byproduct of composting (compost).
- F. Soil Class G-1 (Clean Earth Fill #1)
1. Any soil material excavated on the project site or obtained from borrow areas.
  2. Soil materials unsuitable and, therefore, not approved for this classification are:
    - a. Soils with high organic contents such as: topsoil, peat, muck, organic silts, and clays, marls, etc.
    - b. Manmade or rubble filled soils containing such materials as: foundry sand, fly ash cinders, asphalt, and concrete rubble, etc.
    - c. Silty soils such as: rock flour, loess, etc.
    - d. Soils with gravel larger than 3-inch.
    - e. Silty clay or clays with a high plasticity (CH soils as defined in ASTM D2487).
    - f. All soil contaminated with hazardous waste materials as defined by the EPA.
- G. Soils Class G-2 (Clean Earth Fill #2)
1. Same as Clean Earth Fill #1 above except shall not contain gravel larger than 1½-inch.

## **2.02 SOURCE QUALITY CONTROL**

- A. Tests and Inspections
1. To establish acceptability of material, perform tests for each soils class in accordance to the following standards:
  2. Structure Backfill Material and Sand:
    - a. ASTM C117

- b. ASTM C136
  - c. ASTM D1241
  - d. ASTM D2487
3. Clay Soil:
- a. ASTM C136 (test when gravel content is present)
  - b. ASTM D422
  - c. ASTM D1140
  - d. ASTM D2216
  - e. ASTM D4318
4. Topsoil and Compost/Topsoil:
- a. ASTM D2487
5. Clean Earth Fill:
- a. ASTM D2487
6. In addition to the above, furnish a soil analysis of Topsoil and Compost/Topsoil:
- a. pH
  - b. Phosphorus
  - c. Potassium
  - d. Soluble Salts
  - e. Calcium
  - f. Magnesium
7. Source sample all soils in accordance with ASTM D75.
8. Perform one (1) acceptable test for each type of material at each source.

## **PART 3 - EXECUTION**

### **3.01 APPLICATION**

- A. Use the soil classification as specified or stated in Specification Sections or on Drawings.
- B. Place material in accordance with the Drawings and appropriate Specification Sections for the type of work performed.

**END OF SECTION**

**SECTION 32 05 16**  
**AGGREGATES FOR EXTERIOR IMPROVEMENTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Rip Rap
  - 2. Crushed Rock
  - 3. Concrete Aggregate
  - 4. Crushed Stone and Gravel
  - 5. Granular Backfill
  - 6. Sand

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM C33 Specification for Concrete Aggregates.
  - ASTM C88 Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - ASTM C117 Test for Material Finer than No. 200 Sieve in Mineral Aggregates by Washing.
  - ASTM C131 Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - ASTM C136 Sieve Analysis of Fine and Coarse Aggregates.
  - ASTM C144 Spec. for Aggregate for Masonry Mortar.
  - ASTM C207 Spec. for Hydrated Lime for Masonry Purposes.
  - ASTM C535 Test for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
  - ASTM D75 Sampling Aggregates.
  - ASTM D448 Spec. for Standard Sizes of Coarse Aggregate for Highway Construction.
  - ASTM D1241 Spec. for Materials for Soil-Aggregate Subbase, Base, and Surface Courses.
  - ASTM D2216 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures.
  - ASTM D2487 Classification of Soils for Engineering Purposes.
  - ASTM D4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity of Soils.

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Informational Submittals
  - 1. Source Quality Control Submittals
    - a. Provide test reports showing the results of required material testing.
  - 2. Daily delivery tickets for each load of material delivered to the site.

### **1.05 QUALITY ASSURANCE**

- A. An independent testing laboratory approved by the Owner shall be obtained by the Contractor and provide quality control testing.

## **PART 2 - PRODUCTS**

### **2.01 RIP RAP**

- A. Provide durable field or quarry stone that is sound, hard, dense, resistant to the action of air and water, and free of seams, cracks, or other structural defects.
- B. Provide stone pieces with a length and width no more than twice the thickness.
- C. Concrete slabs may not be substituted for stone.
- D. Provide stones conforming to the size requirements for the riprap grade shown on the Drawings. Riprap shall be furnished as listed below.
  - 1. Light Riprap: 12 inches thick
  - 2. Medium Riprap: 18 inches thick
  - 3. Heavy Riprap: 24 inches thick
  - 4. Extra Heavy Riprap: 30 inches thick

## 2.02 CRUSHED ROCK

### A. General

1. Material shall be clean, sound, hard, dense, durable, field or quarry stone which is free from seams, cracks, or other structural defects. It shall be angular material from shot rock (blasted) or crushed rock having substantially all face of which have resulted from artificial crushing.
2. Loss due to sulfate soundness test shall not exceed 10 percent.
3. Loss due to abrasion test shall not exceed 40 percent.
4. No frozen material.

### B. 6" Crushed Rock or Breaker Run Gradation (Soil Class A-3)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
7-inch	100
6-inch	90
4-inch	75
3-inch	10

### C. 3½-inch Crushed Rock Gradation (Soil Class A-4)

1. ASTM D448-No. 1

<u>Sieve Size</u>	<u>% Passing by Weight</u>
4-inch	100
3½-inch	90-100
2½-inch	25-60
1½-inch	0-15
¾-inch	0-5

### D. 2½-inch Crushed Rock Gradation (Soil Class A-5)

1. ASTM D448-No.2

<u>Sieve Size</u>	<u>% Passing by Weight</u>
3-inch	100
2 ½ inch	90-100
2-inch	35-70
1 ½-inch	0-15
¾-inch	0-5

E. 1½-inch Crushed Rock Gradation (Soil Class A-6)

1. ASTM D448-No. 4

<u>Sieve Size</u>	<u>% Passing by Weight</u>
2-inch	100
1 1/2 inch	90-100
1-inch	20-55
¾ inch	0-15
3/8 inch	0-5

F. ¾-inch Crushed Rock Chips Gradation (Soil Class A-7)

1. ASTM D448-No. 67

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1-inch	100
¾-inch	90-100
3/8-inch	20-55
No. 4	0-10
No. 8	0-5

G. ⅜-inch Crushed Rock Chips Gradation (Soil Class A-8)

1. ASTM D448-No. 8

<u>Sieve Size</u>	<u>% Passing by Weight</u>
½-inch	100
3/8-inch	85-100
No. 4	10-30
No. 8	0-10
No. 16	0-5

## 2.03 CONCRETE AGGREGATE

A. General

1. Aggregate shall be hard, strong, durable particles free from seams, cracks, and other structural defects.
2. Rounded to subangular.
3. Free from organic impurities and debris.
4. No frozen material.



B. Coarse Aggregate Gradation (Soils Class B-1)

1. ASTM C33 - No. 3

<u>Sieve Size</u>	<u>% Passing by Weight</u>
2 ½-inch	100
2-inch	90-100
1 ½-inch	35-70
1-inch	0-15
½-inch	0-5

C. Coarse Aggregate Gradation (Soil Class B-2)

1. ASTM C33 - No. 7

<u>Sieve Size</u>	<u>% Passing by Weight</u>
¾-inch	100
½-inch	90-100
3/8-inch	40-70
No. 4	0-15
No. 8	0-5

D. Fine Aggregate Gradation (Soil Class B-3)

1. ASTM C33

<u>Sieve Size</u>	<u>% Passing by Weight</u>
3/8-inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

E. Masonry Sand Gradation (Soil Class B-4)

1. ASTM C144

<u>Sieve Size</u>	<u>Percent Passing Natural Sand</u>	<u>Manufactured Sand</u>
No. 4	100	100
No. 8	95 to 100	95 to 100
No. 16	70 to 100	70 to 100
No. 30	40 to 75	40 to 75
No. 50	10 to 35	20 to 40
No. 100	2 to 15	10 to 25
No. 200	---	0 to 10

**2.04 CRUSHED STONE AND GRAVEL**

A. General

1. Stone shall be hard, durable, granular material of uniform quality resulting from crushed rock or crushed bank run sand and gravel.
2. Material shall be free from clay lump, organic matter, shale, excess, elongated or flat pieces, and other deleterious substances.
3. Forty-five percent of the particles retained on a No. 4 sieve shall have at least one fractured face.
4. Wear shall not exceed 50 percent.
5. Loss due to sulfate soundness test shall not exceed 18 percent by weight.
6. Total moisture content shall not exceed 7 percent.
7. Filler for blending shall have a maximum liquid limit of 25 percent and a maximum plasticity index of 6.
8. No frozen material.

B. Crushed Stone Gradation (Soil Class C-1)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1 ½-inch	100
3/8-inch	30-65
No. 4	25-55
No. 10	15-40
No. 200	2-12

C. Crushed Stone Gradation (Soil Class C-2)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1-inch	100
3/8-inch	40-75
No. 4	25-60
No. 10	15-45
No. 200	3-12

D. Crushed Stone Gradation (Soil Class C-3)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1-inch	100
¾-inch	95-100
3/8-inch	50-90
No. 4	35-70
No. 10	15-55
No. 200	5-15

E. Crushed Gravel Gradation (Soil Class C-4)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1 1/2-inch	100
1-inch	75-100
3/8-inch	40-75
No. 4	30-60
No. 10	20-45
No. 40	10-30
No. 200	3-10

F. Crushed Gravel Gradation (Soil Class C-5)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1-inch	100
3/8-inch	50-85
No. 4	35-65
No. 10	25-50
No. 40	10-30
No. 200	3-10

G. Crushed Gravel Gradation (Soil Class C-6)

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1-inch	100
3/4-inch	95-100
3/8-inch	50-90
No. 4	35-70
No. 10	20-55
No. 200	8-15

## 2.05 GRANULAR BACKFILL

A. Provide granular material substantially free of deleterious materials that include: shale, chert, phyllite or other altered rock formed from clay materials, soft or porous rock fragments, clay lumps, coal, and other non-durable or organic particles. The aggregate material crushed stone or crushed gravel. No stones over 3-inch sieve shall be present. Granular backfill shall be 1 1/4 inch dense aggregate conforming to the following gradation:

B. Granular Backfill Gradation

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1 1/4 inch	95 – 100
3/4 inch	70 – 93
3/8 inch	42 – 80
No. 4	25 – 63
No. 10	16 – 48
No. 40	8 – 28
No. 200	2.0 – 10.0

## 2.06 SAND

- A. Provide sand material consisting of durable particles ranging in size from fine to coarse in a substantially uniform combination. Unwashed bank-run sand and crushed bank-run gravel will be considered generally acceptable under this specification. Moisture content not to exceed 10%. Sand material to conform substantially to the following gradation table:
- B. Sand Gradation

<u>Sieve Size</u>	<u>% Passing by Weight</u>
2 inch	100
No. 4	45 - 80
Finer Than No. 200	2 - 10

## 2.07 SOURCE QUALITY CONTROL

- A. To establish acceptability of material, perform tests for each soils class in accordance to the following standards:
1. Soils Class A and C:
    - a. ASTM C88.
    - b. ASTM C131 (for coarse aggregates smaller than 1½ inches).
    - c. ASTM C136.
    - d. ASTM C535 (for coarse aggregates 1½ inches and larger).
    - e. ASTM C117 (use when aggregate contains materials finer than No. 200 sieve).
  2. Soils Class B:
    - a. ASTM C88.
    - b. ASTM C117.
    - c. ASTM C136.
  3. Source sample all soils and aggregates in accordance with ASTM D75.
  4. Perform one (1) acceptable test for each type of material at each source.

## **PART 3 - EXECUTION**

### **3.01 APPLICATION**

- A. Use the soil classification as specified or stated on Drawings.
- B. Place material in accordance with the Drawings and appropriate Specification Sections for the type of work performed.

**END OF SECTION**

**SECTION 32 11 23**  
**AGGREGATE BASE COURSES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Materials testing.
  - 2. Foundation preparation.
  - 3. Crushed aggregate base course for roads, shoulders, and parking areas.
  - 4. Preparation of crushed aggregate base course for paving.

**1.02 REFERENCES**

- A. American Association of State Highway and Transportation Officials (AASHTO):
  - AASHTO T2            Sampling Stone, Slag, Gravel, Sand, and Stone Block for Use as Highway Materials
  - AASHTO T27        Sieve Analysis of Fine and Coarse Aggregates
  - AASHTO T37        Sieve Analysis of Mineral Filler
  - AASHTO T89        Determining the Liquid Limit of Soil
  - AASHTO T90        Determining the Plastic Limit and Plasticity Index of Soils
  - AASHTO T104      Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
  
- B. American Society for Testing and Materials (ASTM):
  - ASTM D1557        Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Lb. (4.54 kg) Rammer and 18-In. (457 mm) Drop.
  - ASTM D6938        Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

**1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
  
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

## **1.04 SUBMITTALS**

### **A. Informational:**

1. Submit two (2) copies of the results of quality control testing (include location where test was done):
  - a. Materials source testing.
    - (1) Aggregate supplied from a previously approved source provide source testing report and approval letter from Owner the material was supplied.
  - b. Crushed aggregate base material installation testing.
  - c. Additional density and gradation testing, if required.
2. Submit daily one copy of weight tickets showing the net weight for each truckload of crushed aggregate base material delivered and placed. Tickets will only be considered for payment if received on the same day the material is placed.
3. Field quality control testing results.

## **1.05 QUALITY ASSURANCE**

- ### **A. Obtain an independent testing laboratory approved by the Owner to provide quality control testing.**

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

### **A. Aggregates**

1. Store aggregates to prevent contamination by foreign matter or by aggregates of different sizes.

### **B. Delivery of Aggregates**

1. Vehicles used to transport aggregates shall be of a type to minimize loss of materials and excessive segregation of particles.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

#### **A. Aggregates**



1. Provide aggregate material substantially free of deleterious materials that include: shale, chert, phyllite or other altered rock formed from clay materials, soft or porous rock fragments, clay lumps, coal, and other non-durable or organic particles.
2. Provide aggregates consisting of hard, durable particles of crushed stone and a filler of natural sand, stone sand or other finely divided mineral matter.
  - a. Remove oversize material by screening or by crushing to required sizes.
3. Liquid Limit and Plasticity Index:
  - a. Aggregate including any blended filler shall have a liquid limit of not more than 25 and a plasticity index of not more than 6.
4. Fracture Count:
  - a. At least 58 percent of particles retained on the No. 4 sieve shall have at least one fractured face.
5. Soundness:
  - a. When the fraction of aggregate retained on the No. 4 sieve is subjected to five cycles of the sodium sulfate soundness test, weighted loss shall not exceed 18 percent by weight.
6. Filler for Blending:
  - a. Additional mineral filler required to meet gradation requirements or for satisfactory binding of material shall be uniformly blended with base course material at the screening plant.
  - b. Mineral fillers shall be free from agglomerations or lumps and shall contain not more than 15 percent of material retained on a No. 4 sieve.
7. Moisture Content: Not to exceed 7 percent.
8. Aggregate shall be crushed stone of crushed angular particles of quarried rock retained on the No. 10 sieve.

9. Aggregate Gradation Requirements

a. 3 inch dense-graded base material:

<u>Sieve Size</u>	<u>% By Weight Passing Crushed Stone</u>
3 inch	90-100
1½ inch	60-85
¾ inch	40-65
No. 4	15-40
No. 10	10-30
No. 40	5-20
No. 200	2.0-12.0

b. 1¼ inch dense-graded base material:

<u>Sieve Size</u>	<u>% By Weight Passing Crushed Stone</u>
1 ¼ inch	95-100
¾ inch	70-93
3/8 inch	42-80
No. 4	25-63
No. 10	16-48
No. 40	8-28
No. 200	2.0-12.0

(1) Limited to a maximum of 8.0 percent for base placed between old and new pavement.

c. ¾ inch dense-graded base material:

<u>Sieve Size</u>	<u>% By Weight Passing Crushed Stone</u>
1 inch	100
¾ inch	95-100
3/8 inch	50-90
No. 4	35-70
No. 10	15-55
No. 40	10-35
No. 200	5.0-15.0

10. Reclaimed Asphalt
  - a. Reclaimed asphalt is crushed or processed asphaltic pavement or surfacing.
  - b. Reclaimed asphalt with 100 percent passing a 1 1/4-inch sieve may be used as 1 1/4-inch base.
  - c. If using reclaimed asphalt in shoulders, the allowable reclaimed asphalt shall be limited in content to 50 percent or less.
  - d. Do not use reclaimed asphalt material unless stated as optional elsewhere.

## **2.02 SOURCE QUALITY CONTROL**

- A. Test aggregate material per the following requirements:
  1. Sampling: AASHTO T2.
  2. Sieve Analysis:
    - a. AASHTO T27 for aggregates including fracture count.
    - b. AASHTO T37 for mineral fillers.
  3. Liquid Test: AASHTO T89.
  4. Plasticity Index: AASHTO T90.
  5. Soundness: AASHTO T104 using sodium sulfate

## **PART 3 - EXECUTION**

### **3.01 PREPARATION OF FOUNDATION**

- A. Prepare the foundation for aggregate base course in accordance with requirements of applicable Specification Section(s).
- B. Do not place the aggregate base course on a foundation that is soft, spongy or covered by ice or snow.
- C. Do not place base material on a dry or dusty foundation when existing condition would cause rapid dissipation of moisture from base material and hinder or preclude its proper compaction.

1. Apply water to such dry foundations and rework or recompact as necessary.
- D. Before placing aggregate base course material, identify areas of yielding subgrade and perform corrective work.
1. After rough grading, on all or a portion of the subgrade, identify yielding areas for Engineer evaluation.
  2. The Engineer will evaluate identified areas of yielding subgrade to determine if corrective work or excavation below subgrade (EBS) is required.
  3. Provide loaded trucks and run the grade to confirm yielding areas.
  4. Perform EBS in yielding areas and backfill with 1 1/4 -inch dense-graded base material.
  5. Verify that yielded areas of the subgrade have been corrected by providing loaded trucks and run the grade to confirm the correction.

### **3.02 AGGREGATE BASE COURSE INSTALLATION**

- A. Use gradations as follows:
1. 3-inch dense-graded base material may be used only in the lower portion of the base layer (minimum 6 inches thick) when the base layer is 10 inches or greater in total thickness.
  2. 1 1/4-inch dense-graded base material shall be used under the pavement at a minimum thickness of 4 inches.
  3. 3/4-inch dense-graded base material shall be used under the paved shoulder and where aggregate material is exposed in the shoulder and driveways.
- B. Placing aggregate base course
1. Place aggregate material in a method that minimizes hauling on the subgrade or in-place base material. Do not use vehicles or operations that damage the subgrade or in-place base material.
  2. Route hauling equipment uniformly over previously placed base material.
  3. Construct crushed aggregate base course to the width, thickness, section and location shown on the Drawings.

4. Shape and the base surface to within 0.04 feet of the elevations shown on the Drawings.
5. Do not exceed 6 inches of compaction thickness for 1¼-inch or ¾-inch dense-graded base material. Do not exceed 9 inches of compaction thickness for 3-inch dense-graded base material.
  - a. Install and compact approximate equal thicknesses when multiple courses are required.
6. Deposit the material on the foundation or previously placed layer in such a manner as to minimize segregation and to facilitate spreading to a uniform layer of the required dimensions.
7. Provide adequate moisture in the aggregate during placing, shaping, and compacting to prevent segregation and achieve adequate compaction.

C. Compaction

1. Provide compaction after a layer of aggregate has been placed and spread to the required thickness, width, and section.
2. Compact the base until there is no appreciable displacement, either laterally or longitudinally, under the compaction equipment.
3. Compact each layer before placing the subsequent layer.
4. If the material is deficient in moisture content to attain the required density, add necessary water during compaction operations by means, which provides a uniform application to achieve proper compaction.
5. Use specialized pneumatic or vibratory compaction equipment or a combination of both types of machines. Do not use tamping rollers.
6. Compact each layer or course placed to at least 95 percent of the maximum dry density as determined by the Modified Proctor Test (ASTM D1557).
7. Rework or remove areas where proper compaction is not obtainable due to segregation of materials, excess fines or other deficiencies. Replace removed material with material that will yield the desired results.
8. Prior to and during compaction operations, shape and maintain the material to the proper dimensions.

D. Proof (Test) Rolling

1. Prior to paving operations, test the base course strength by proof rolling.
2. Proof roll finished base course by rolling with a fully loaded tandem axle dump truck.
3. Proof rolling includes running fully loaded trucks over the entire roadway (pavement plus shoulders or extent beyond back of curb) width.
4. Stabilize weak or yielding areas in the base course by removing the placed/existing base course material and replace with clean base aggregate.
5. Provide a subsequent proof roll test for all repaired/stabilized areas within the base course.
6. In the event that weather, or other conditions change the condition of the base course after initial proof roll test and/or stabilization has been performed, provide a proof roll test of the entire base course after such event.
7. Take necessary precautions to protect existing structures from damage during proof roll test.

E. Maintenance

1. Provide maintenance of the base course until surface paving is complete or until the base is otherwise accepted.

F. Dust Control

1. Minimize the dispersion of dust from the base course by the application of water or other approved dust control materials.

G. Preparation of Base for Paving

1. Prior to paving, perform all necessary scarifying, shaping, and compacting to provide the required cross-sectional contour, a profile free from abrupt changes in elevation, and a surface free from pits, holes, depressions, or projections above the normal surface.
2. Remove any standing or ponded water, and ice or snow from the base before paving begins.

### **3.03 FIELD QUALITY CONTROL**

#### **A. Installation Testing**

1. Perform a minimum of one (1) moisture/density test in accordance with ASTM D6938 (Nuclear Method) per 10,000 sq. ft. per layer of base course placed.
2. Perform a minimum of one (1) sieve analysis per day conforming with:
  - a. AASHTO T27 for aggregates including fracture count.
  - b. AASHTO T37 mineral fillers.

#### **B. Provide additional Density and Gradation Testing when:**

1. Aggregate density does not meet project requirements.
2. There is a change in method of compaction.
3. There is a change in source or quality of aggregate.

**END OF SECTION**

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**SECTION 32 12 00  
FLEXIBLE PAVING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Hot Mix Asphalt (HMA)
- B. Tack Coat

**1.02 REFERENCES**

- A. State of Wisconsin Department of Transportation (WisDOT)
  - 1. WisDOT Standard Specifications for Highway and Structure Construction (“State Specifications”), current edition, and all supplemental and interim supplemental specifications, as they may pertain, with the exception of the following items which shall not apply:
    - a. Method of measurement and basis of payment.
  - 2. Asphaltic concrete pavement shall comply and be constructed in accordance with:
    - a. WisDOT 450, General Requirements for Asphaltic Surface
    - b. WisDOT 455, Asphaltic Materials
    - c. WisDOT 460, Hot Mix Asphalt Pavement (HMA)

**1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

**1.04 SUBMITTALS**

- A. Action Submittals:
  - 1. Submit two (2) copies of each asphaltic concrete mix design proposed for the project.
- B. Informational Submittals:
  - 1. Submit two (2) copies of the results of quality control testing.

2. Submit daily one (1) copy of weight tickets showing the net weight for each truckload of asphalt delivered and placed. Provide gross, tare, and net weights as well as date, time, ticket number, project, and mix type. Tickets will only be considered for payment if received on the same day the material is placed.

## **1.05 QUALITY ASSURANCE**

### **A. Testing:**

1. Obtain an independent testing laboratory approved by the Owner to provide quality control testing.
2. Testing agency shall perform a minimum of one density test for every 1,500 square yards of each layer of pavement placed or fraction thereof.
3. Retests are required within testing areas not meeting minimum density requirements.
4. If density testing results are below minimum requirements, submit proposed corrective action to Engineer.

## **1.06 FIELD OR SITE CONDITIONS**

A. Place asphaltic mixture only on a prepared, firm, and compacted base, foundation layer, or existing pavement substantially surface-dry and free from loose and foreign material. Do not place pavement over frozen subgrade or base, when roadbed is unstable or during rain or snow.

### **B. Cold Weather Paving**

1. Remove Subsections 450.3.2.1.1(1) of the State Specifications and replace with the following:

Asphaltic pavement shall not be placed when the air temperature in the shade and away from artificial heat sources is less than 36° F. If Engineer allows placing asphaltic mixtures below the specified minimum temperature, either at the Contractor's request or to complete the Work to the stage the contract requires, the Work will be performed at the Contractor's risk. Final inspection of the asphaltic concrete pavement will be deferred until May of the following year. Before final acceptance of the Work, restore all pavement damage or defects the Engineer attributes to temperature or other weather conditions. Repair or replace areas of pavement as identified by the Engineer.

C. Wet Weather Conditions

1. In the event of sudden or impending rain, material in transit will be permitted to be laid at the Contractor's risk providing the pavement is free of standing water and the proper temperature of the delivered asphalt material is maintained. Approval to unload the trucks in transit shall in no way relax the requirements of quality, density, or smoothness of the asphalt being placed.

**PART 2 - PRODUCTS**

**2.01 ASPHALT PAVEMENT MATERIALS**

- A. Asphaltic pavement shall be in accordance with requirements for WisDOT Standard Specifications except as noted in the following:

1. Hot mix asphalt pavement shall be:
  - a. Lower Layer: 4 LT 58-28H
  - b. Upper Layer: 4 LT 58-28H

- B. Aggregate in the pavement mix shall conform to Section 460 of WisDOT "State Specifications", and comply with the minimum layer thicknesses as listed below:

<u>Gradation No.</u>	<u>Nominal Size</u>	<u>Minimum Layer Thickness</u>
3	3/4" (19.0 mm)	2.25"
4	1/2" (12.5 mm)	1.75"
5	3/8" (9.5 mm)	1.50"

C. Pavement Mix Design

1. Prior to beginning construction, submit copies of the State approved design mixes for materials proposed to be used on this project.
2. Produce and incorporate the asphaltic mixture in the Work on the basis of job-mix formula. The Contractor shall be responsible for the asphaltic job-mix design report, conforming to Section 460 of WisDOT Standard Specifications, and shall submit a signed copy of the report to the Engineer for review at least two weeks prior to start of paving operations.

**2.02 TACK COAT MATERIALS**

- A. Tack coat material shall be an asphalt emulsion, conforming to Section 455 of WisDOT State Specifications, diluted with an equal amount of water and applied at a consistent rate of 0.05 to 0.15 gallons per square yard or as directed by the Engineer.

## **2.03 EQUIPMENT**

- A. Paver: The paver shall have sufficient power and traction to operate on grades. Screed extensions with static extensions shall not exceed 12 inches. The paver shall have the ability to pave widths necessary to meet the lane paving width/passes requirements. Paver must have the ability to control the asphalt thickness and ride quality using a contact or non-contact grade reference system.

## **PART 3 - EXECUTION**

### **3.01 SURFACE PREPARATION**

- A. Prepare a compacted foundation in accordance with these specifications. All required corrections; filling of potholes, sags, depressions, must be addressed. Edges of match points, curb and gutter, castings, etc. must be cleared of excess material that may prevent installation of the specified pavement thickness.

### **3.02 PAVEMENT THICKNESS**

- A. The pavement thickness shall match the existing thickness unless the minimum thickness(es) specified within these specifications apply.
- B. Place pavement in two or more lifts conforming to Section 460 of WisDOT Standard Specifications. The maximum compacted thickness of individual layers shall not exceed four inches for lower layers and three inches for upper layers.

### **3.03 TEMPERATURE OF ASPHALT PLACED**

- A. All asphalt (both upper and lower layers) shall be delivered to the project site at a temperature not lower than 250 °F.

### **3.04 TACK COAT**

- A. Apply a thin, uniform layer of tack coat to each lower layer prior to placing succeeding layer. Apply the tack coat the same day that the next layer is placed. Do not place pavement until the tack coat emulsion has broken (water and asphalt separate) or is tacky to the touch.

### **3.05 PAVEMENT PASSES**

- A. Do not straddle the centerline with the paver. Either 2 or 4 passes shall be used. No 3 pass paving will be allowed.

### **3.06 PAVEMENT COMPACTION**

- A. All pavements shall be built in accordance with the Maximum Density Method per Section 460 of WisDOT Standard Specifications. The maximum specific gravity value shall be indicated on the asphaltic job-mix design report.

B. Compact pavements to a density not less than that shown in the table below:

Minimum Required Density [1]			
Location	Layer	Percent of Target Maximum Density	
		Mixture Type	
		LT and MT	HT
Traffic Lanes [2]	Lower	93.0 [3]	93.0 [4]
	Upper	93.0	93.0
Side Roads, Crossovers, Turn Lanes, & Ramps	Lower	93.0 [3]	93.0 [4]
	Upper	93.0	93.0
Shoulders & Appurtenances	Lower	91.0	91.0
	Upper	92.0	92.0

[1] The table values are for average lot density. If any individual density test result fall more than 3.0 percent below the minimum required target maximum density, the engineer may investigate the acceptability of that material.

[2] Includes parking lanes.

[3] Minimum reduced by 2.0 percent for a lower layer constructed directly on crushed aggregate or recycled base courses.

[4] Minimum reduced by 1.0 percent for a lower layer constructed directly on crushed aggregate or recycled base courses.

C. Verify the degree of compaction and submit a report to the Engineer which includes date paved, date tested, test locations, and degree of compaction.

D. All compaction (rolling) operations shall be performed during daylight hours.

E. Replace pavement full lane width with all joints saw cut and tacked when:

1. Minimum density is not met.
2. Minimum asphalt content is not met.
3. There is significant segregation, raveling, rutting, or deformation.

**END OF SECTION**

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**SECTION 32 16 23**  
**CONCRETE SIDEWALKS AND DRIVEWAYS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Excavating
  - 2. Aggregate Base Course
  - 3. Driveway Construction

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM A185 Specification for Welded Steel Wire Fabric for Concrete Reinforcement.
  - ASTM C31 Making and Curing Concrete Test Specimens in the Field.
  - ASTM C33 Specification for Concrete Aggregate.
  - ASTM C39 Test for Compressive Strength of Cylindrical Concrete Specimens.
  - ASTM C94 Specification for Ready-Mixed Concrete.
  - ASTM C143 Test for Slump of Portland Cement Concrete.
  - ASTM C150 Specification for Portland Cement.
  - ASTM C172 Sampling Fresh Concrete.
  - ASTM C231 Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
  - ASTM C1116 Standard specification for Fiber-Reinforced Concrete
  - ASTM C1315 Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
  - ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soils-Aggregate Mixtures Using 10-Lb. (4.54 Kg) Rammer and 18-In. (457 mm) Drop.
  - ASTM D1751 Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
  - ASTM E329 Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.
  - ASTM C618-15 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- B. American Concrete Institute (ACI)

ACI 304	Measuring, Mixing, Transporting and Placing Concrete.
ACI 305	Recommended Practice for Hot Weather Concreting
ACI 306	Recommended Practice for Cold Weather Concreting
ACI 347	Guide to Formwork for Concrete

- C. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO M105 Standard Specification for Gray Iron Castings
  - AASHTO M148 Curing Compounds
- D. Americans with Disabilities Act (ADA): Accommodations Guidelines
- E. State of Wisconsin Department of Transportation (WisDOT):  
Standard Specifications, WisDOT Section 501, Concrete

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Action Submittals
  - 1. Current concrete design mix of composition and strength testing results for design mix for each type of concrete.
- B. Informational Submittals
  - 1. Results of all Quality Control testing.
  - 2. Daily load tickets of concrete placed.

### **1.05 QUALITY CONTROL**

- A. Employ an independent testing laboratory approved by the Owner to provide testing services as follows:
  - 1. Material Acceptance Testing:
    - a. Design mix.
  - 2. Installation Testing:
    - a. Slump.



- b. Air-entrainment.
  - c. Compressive strength test.
3. Additional Testing:
- a. Perform under following circumstances:
    - (1) Material failure.
    - (2) Change in ready-mix source.
    - (3) Design mix changes requested by Contractor.
- B. The following shall be in accordance with the stated references:
- 1. Inspection and Testing: ASTM E329.
  - 2. Sampling: ASTM C172.
  - 3. Slump: ASTM C143.
  - 4. Air-Entrainment: ASTM C231.
  - 5. Compressive Strength Test: ASTM C31 and C39.
- C. Perform tests required by this section with the following frequency:
- 1. Two tests daily or one per 100 cubic yards placed, whichever number is greater.
- D. Compressive strength test shall consist of four standard test cylinders made from a single batch of concrete:
- 1. Test one cylinder at 7 days.
  - 2. Test two cylinders at 28 days.
  - 3. Test remaining cylinder in the event prior tests fail.
  - 4. Compressive strength tests shall be considered satisfactory when 28-day tests meet the following:
    - a. Test results equal or exceed specified compressive strength.
    - b. No individual test falls more than 500 psi below specified compressive strength.

5. Failure of compressive strength tests shall result in following additional testing:
  - a. Provide two core samples of each portion of work affected and perform compressive strength tests.
  - b. Replace work if core samples do not equal or exceed specified compressive strength.

## **PART 2 - PRODUCTS**

### **2.01 CONCRETE**

- A. Conform to ASTM C94 and the following:
  1. Concrete shall be Grade A or A-FA (fly ash), air-entrained, in conformance with WisDOT Section 501.
  2. High early strength concrete shall be Grade C in conformance with WisDOT Section 501, Concrete.
  3. Seven-Day Compressive Strength: 3000 psi Minimum.
  4. Twenty-eight Day Compressive Strength: 4000 psi Minimum.
  5. Maximum Aggregate Size: 1½ inches.
  6. Air Content: 6 percent ± 1.5 percent.
  7. Maximum Water-Cement Ratio: 0.44.
  8. Slump:
    - a. Slip-Formed Concrete Pavement: 2.5 inches or less.
    - b. Not Slip-Formed with Surface Vibration Concrete Pavement: 1.5 to 3 inches.
    - c. Not Slip Formed with Internal Vibration: 1 to 3 inches
- B. Admixtures to lower freezing point of concrete are not permitted.

### **2.02 AGGREGATES**

- A. Conform to ASTM C33.

### **2.03 EXPANSION JOINT**

- A. Conform with ASTM D1751.

B. Thickness: 1/2 inch.

## 2.04 CURING MATERIALS

A. Linseed Oil

1. Furnish liquid membrane-forming curing compounds composed of a blend of boiled linseed oil and high viscosity, heavy bodied linseed oil emulsified in a water solution conforming to AASHTO M 148, Type 2 Class B. Test material at an application rate of 1 gallon per 200 square feet.
2. Waive drying time requirements. The chemical requirements (volumes are exclusive of added pigments) are as follows:

<u>Oil Phase (50+/-4% by volume)</u>	<u>(Percent By Mass)</u>
Boiled Linseed Oil	80
Z-8 Viscosity Linseed Oil	20
Water Phase (50 +/-4% by volume)	100

## 2.05 CRUSHED AGGREGATE BASE MATERIAL

A. Construct sidewalks and driveways on a layer of compacted base aggregate dense base course, placed to the thickness of:

1. 6 inches for driveways.

B. Provide base material conforming:

1. Use 1 1/4" crushed aggregate base course.
2. Aggregates shall consist of hard, durable particles of crushed stone or crushed gravel and a filler of natural sand, stone sand or other finely divided mineral matter.
3. Remove oversize material by screening or by crushing to required sizes.
4. Composite material shall be free from organic matter, shale, and lumps or balls of clay and shall conform to the gradation requirements below.

## 2.06 REINFORCEMENT

- A. Steel Fabric: 6 inches by 6 inches – W1.4 x W1.4 WWF (ASTM A185)
- B. Polypropylene fiber mesh reinforcement (ASTM C1116)

## **PART 3 - EXECUTION**

### **3.01 PREPARING THE FOUNDATION**

- A. Prepare the foundation by excavating or filling to the required elevation of the subgrade. Tamp or compact the foundation to ensure stability. In cuts, make the foundation wide enough to allow placing forms and performing concrete placement and finishing. On embankments, construct the foundation at least 2 feet wider than the proposed concrete section and extend it at least one foot beyond each end of the concrete section.
- B. Unless specified otherwise, fill holes, ruts, and other depressions in the foundation with materials similar to those in the existing foundation. The contractor may use granular or aggregate base.

### **3.02 PLACING AND GRADING BASE COURSE**

- A. Provide base material to the thickness specified within this Section.
- B. The subgrade shall be prepared by fine grading to the lines, grades, and cross-sections shown on the drawings.
- C. Compact to minimum 95 percent modified proctor density (ASTM D1557).
- D. Excess material shall be disposed of at a site provided by Contractor.

### **3.03 FORMS**

- A. Conform to ACI 347.
- B. Forms shall be of the size, shape, and depth to construct the sidewalk and driveway as required.
- C. Brace and tie together forms to maintain position and shape.
- D. Clean and coat forms with clear, non-staining mineral or paraffin base form oil prior to placement of concrete against forms.
- E. Surfaces in contact with concrete shall be free from frost, debris, and other deleterious material.
- F. Moisten the base prior to placement of concrete.
- G. Remove laitance and other unsound material before freshly placed concrete is placed against previously placed concrete.
- H. Protect concrete from damage until it has hardened sufficiently to resist damage.

### **3.04 CONCRETE THICKNESS**

- A. Unless noted otherwise, furnish the following minimum thicknesses:
  - 1. Residential Driveway: 6 inches.
  - 2. Commercial and Industrial Driveway: 8 inches.

### **3.05 ENVIRONMENTAL REQUIREMENTS**

- A. Hot Weather Concreting
  - 1. Follow ACI 305 whenever mean surrounding air temperature equals or exceeds 80°F (27°C).
  - 2. Do not place concrete whenever air temperature equals or exceeds 90°F (32°C).
- B. Cold Weather Concreting
  - 1. Follow ACI 306 whenever mean surrounding air temperature is below 40°F (4.5°C).
  - 2. Do not place concrete during rain, sleet, or snow unless protection is provided.

### **3.06 PLACING CONCRETE**

- A. Conveying Concrete
  - 1. Convey concrete from mixer to place of final deposit by methods that will prevent separation or loss of materials.
  - 2. Equipment for chuting, pumping, or pneumatically conveying concrete shall be capable of providing a supply of concrete at site of work without separation of ingredients and without interruptions sufficient to permit loss of plasticity between successive placements.
- B. Depositing Concrete
  - 1. Place concrete on prepared and moistened foundation in a single lift.
  - 2. Deposit concrete as nearly as practicable to its final position to avoid segregation due to rehandling or flowing.
  - 3. Carry on concreting at such a rate that concrete is at all times plastic and flows readily into spaces between reinforcing.

4. Do not deposit concrete that has partially hardened or that has been contaminated by foreign materials.
5. Do not use retempered or remixed concrete.
6. After concreting is started, it shall be carried on as a continuous operation until placing a section is completed.
7. Thoroughly consolidate concrete by suitable means during placement, and thoroughly work concrete around reinforcement and embedded fixtures, and into corners of forms.

### **3.07 CONTRACTION JOINTS**

- A. Locate in accordance with details and following criteria:
  1. Through sidewalks at uniform intervals at a 5-foot typical spacing. Contraction joint spacing should typically match adjacent sidewalk sections.
  2. Driveways: Place contraction joints parallel to curb line at 6-foot maximum spacing. Place contraction joints at right angles to the curb line at an 8-foot maximum spacing. Center joints to create symmetrical sections.
  3. Joints shall not deviate more than five degrees from a right angle measured at intersecting joints or flatwork edge, and more than ½ inch from a straight line.
- B. Joint Dimensions
  1. Depth:
    - a. Minimum 1 inch or one-fifth of slab depth whichever is greater.
  2. Width:
    - a. Minimum ⅛ inch for sawed joints, ¼ inch for other types.
    - b. Maximum ¼ inch for sawed joints, ⅜ inch for other types.

### **3.08 EXPANSION JOINTS**

- A. Install location and geometry of expansion joints as shown on the Drawings or according to the following criteria:
  1. At right angle or tee intersections.
  2. At sidewalk and stoop intersections.

3. Where sidewalk and driveway adjoin vertical surfaces.
  4. Where sidewalk and driveway adjoin existing pavements.
- B. Extend filler full width and depth of concrete, with top slightly below finished surface of concrete.

### **3.09 REINFORCEMENT**

- A. Steel Fabric: Unless noted otherwise on Drawings, place reinforcement fabric 2 inches clear of the top surface of the concrete.
- B. Fiber Mesh: Reinforce concrete driveways (and thickened sidewalk sections through driveways) with 1.5 pounds per cubic yard of polypropylene fiber mesh.

### **3.10 FINISHING**

- A. Strike off concrete to a true and even surface.
- B. Finish float and trowel surface smooth.
- C. Brush or lightly broom surface at right angles to traffic.

### **3.11 CURING**

- A. Start curing activities as soon as free water has disappeared from the surface of concrete after placing and finishing.
- B. Apply curing compound to all exposed surfaces by spraying a uniform coating in such a manner as to provide a continuous water impermeable surface. Apply in accordance with manufacturer's recommendations to limit loss of water to not more than 0.40 kg/m<sup>2</sup> in 72 hours.
- C. Maintain all exposed concrete surfaces moist for the first 7 days after placement
- D. Under hot weather conditions, conform to ACI 305.
- E. Under cold weather conditions, conform to ACI 306.
- F. During curing period, protect concrete from damaging mechanical disturbances, water flow, loading, shock, and vibration.

### **3.12 EXISTING CONCRETE FLATWORK**

- A. When abutting to existing flatwork, provide the following:
1. Saw cut existing concrete at construction limits.
  2. Install expansion joints between existing and new construction.

### **3.13 PROTECTION OF WORK**

- A. Place and maintain suitable barricades and, if necessary, provide personnel to keep traffic off the newly constructed pavement until pavement is opened for service. Protect the pavement against both public traffic and construction activities. Repair or replace pavement damaged by traffic or otherwise damaged before acceptance as the Engineer directs. Arrange to have available materials for protecting the unhardened concrete against rain damage.
- B. If rain is pending, cover unhardened concrete immediately with plastic or other approved material secured along pavement edges. Provide drainage as required to protect the work.

### **3.14 OPENING TO TRAFFIC**

- A. No pedestrian traffic allowed for a period of at least 3 days after placing concrete. No vehicular traffic allowed for a period of at least 7 days or until concrete has attained a compressive strength of at least 3,000 pounds per square inch.

**END OF SECTION**



**SECTION 32 17 23  
PAVEMENT MARKINGS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Epoxy
  - 2. Glass Beads
  - 3. Surface Preparation
  - 4. Application
  - 5. Protection of Other Property

**1.02 REFERENCES**

- A. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO M247 Standard Specification for Glass Beads Used in Pavement Markings
  - AASHTO M248 Ready-Mixed White and Yellow Traffic Paint

**1.03 QUALITY ASSURANCE**

- A. The Contractor shall be experienced in this type of work and shall submit a statement of qualifications listing his experience when requested by the Engineer.

**1.04 SEQUENCING AND SCHEDULING**

- A. Schedule and coordinate pavement marking Work with other trades. Do not proceed with Work until all related Work necessary to complete the pavement marking is completed.

**1.05 FIELD OR SITE CONDITIONS**

- A. Paint shall not be applied:
  - 1. When air temperature is below 40 degrees F.
  - 2. When air temperature is predicted to drop below 40 degrees F within 18 hours after application.
  - 3. When surfaces are too damp or moist.

4. When relative humidity exceeds 85 percent or if the relative humidity is predicted to exceed 85 percent within 18 hours after application.

## **PART 2 - PRODUCTS**

### **2.01 EPOXY**

- A. General: Deliver materials to the job site unopened, in manufacturer's containers legibly marked with the contents, color, batch number, date manufactured, and manufacturer's name and address. Do not use material more than 1 1/2 years after its date of manufacture.
- B. Epoxy: Epoxy shall be fast cure. If Engineer requests, submit a certificate of compliance certifying that the epoxy supplied under the contract conforms to these specifications. Furnish epoxy from the following manufacturers:
  1. Sherwin-Williams
  2. Ennis Flint
  3. Poly Carb, Inc.
  4. Swarco

### **2.02 GLASS BEADS**

- A. Furnish dual coated glass beads treated for both moisture resistance and adherence conforming to AASHTO M247, Type I, except with a minimum of 80 percent true spheres. If Engineer requests, for each batch of beads actually furnished for the work, submit a certificate of compliance certifying that the beads supplied under the contract conform to these specifications. Furnish beads from the following manufacturers:
  1. Ennis-Flint
  2. Potters Industries
  3. Hillcrest

## **PART 3 - EXECUTION**

### **3.01 PREPARATION OF SURFACES**

- A. Prepare the surface receiving marking to promote a good bond. Use equipment with a dust control system. Remove dust, dirt, oil, grease, loose paint, gravel, debris, or other materials and contaminants that might prevent bonding. Ensure

that the surface is dry and free from frost, except the contractor may apply epoxy to damp pavement.

- B. Prepare concrete surfaces using brush-off blasting to remove curing compound, protective surface treatment on structures.
- C. Air blast or sweep milled asphaltic surfaces.

### **3.02 EQUIPMENT**

- A. Epoxy: Use equipment that can spray both yellow and white material to produce uniform lines of the specified dimension. The equipment shall also be able to do the following:
  - 1. Apply lines both on the left and right sides, not necessarily simultaneously.
  - 2. Apply 2 lines simultaneously, with either line in a solid or intermittent pattern, in yellow or white.
- B. Glass Bead: The cycling mechanism used for applying lane skip lines shall produce uniform cycles. The equipment shall also have a device to register the daily-accumulated installed length for each gun. Use automatic, mechanical devices to apply glass beads to centerline, lane line, edgeline, and no-passing barrier line markings.

### **3.03 APPLICATION**

- A. Delay application to:
  - 1. New concrete pavement for 28 days after pavement installation.
  - 2. Seal coated surfaces for at least 14 days after applying seal coat.
  - 3. New asphalt pavement for 7 days after pavement installation.
- B. For the initial application, apply epoxy uniformly across the line at or exceeding a wet film thickness as follows:
  - 1. 25 mils for seal coated surfaces, and epoxy overlay surfaces.
  - 2. 20 mils for asphalt or concrete rumble strip surfaces.
  - 3. 20 mils for tined or diamond ground concrete pavement surfaces.
  - 4. 15 mils for all other pavement surfaces.

5. For subsequent applications, apply epoxy uniformly across the line at or exceeding wet film thickness of 16 mils for all pavement surfaces.
- C. Apply glass beads uniformly across the width of the line. For the initial application on new seal coat surfaces, apply at or exceeding 25.0 pounds per gallon of epoxy. For other pavement surfaces and subsequent applications on seal coat surfaces, apply at or exceeding 22.5 pounds per gallon of epoxy.
- D. Striping shall be installed according to the dimensions shown on the Drawings.
  1. The Contractor is responsible for marking layout. If Contractor has regulatory concerns related to placement, widths, lengths, etc. as provided for on the Drawings, coordinate with Engineer prior to installation of pavement marking in question.
- E. Finished markings shall be:
  1. Uniform in width.
  2. With sharp, well defined edges and ends.
  3. Straight, without waviness. Curves shall be smooth.
- F. Apply markings uniformly and smoothly so that no excess material collects at any point.
- G. Finished surface shall be free from streaks, pits, wrinkling, and other irregularities.
- H. Do not spray the paint when wind conditions preclude protecting adjacent work or property.

### **3.04 PROTECTION**

- A. Protect all adjacent work at all time during the striping. Upon completion, remove all paint spots from adjacent surfaces.
- B. Remove all debris generated by this work including but not limited to excess glass beads.

**END OF SECTION**

**SECTION 32 31 13**  
**CHAIN LINK FENCES AND GATES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Chain link fence
  - 2. Posts
  - 3. Rails
  - 4. Tension wires
  - 5. Gates
  - 6. Latches

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  - ASTM A392 Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
  - ASTM A491 Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric
  - ASTM A 817 Metallic-Coated Wire for Use in Chain Link Fence
  - ASTM F567 Standard Practice for Installation of Chain-Link Fence
  - ASTM F626 Standard Specification for Fence Fittings
  - ASTM F900 Standard Specification for Industrial and Commercial Swing Gates
  - ASTM F1043 Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework
  - ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates
- B. Chain Link Fence Manufactures Institute (CLFMI) "Product Manual".

**1.03 ALLOWANCES**

- A. If so stated in the specification "Allowances", installation testing will be paid as an allowance. All other testing will be incidental to the Work.

- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

#### **1.04 SUBMITTALS**

- A. Action: Shop Drawings
  - 1. Provide assembly and installation drawings including:
    - a. Gates
    - b. Post spacing.
    - c. Location of gate, corner, end and pull posts.
- B. Informational: Product Data
  - 1. Chain-link fencing components
  - 2. Accessories.
  - 3. Quality Assurance/Control Submittals
    - a. Provide certification that the material was manufactured, sampled, tested, and inspected in accordance with the referenced ASTM specification.
    - b. Provide copy of standard manufacturer’s warranty

#### **1.05 QUALITY ASSURANCE**

- A. Fencing material and accessories must be supplied by one manufacturer.

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

- A. Deliver material in manufacturer's original packaging with tags and labels intact.
- B. Deliver materials to the site in an undamaged condition.
- C. Store materials off the ground to protect against oxidation caused by ground contact.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Chain Link Fabric

1. Zinc-Coated Steel in accordance with ASTM A392 with Class 2 weight class.
2. Mesh Size
  - a. Non-Slatted Fence: 2-inch diamond pattern.
3. Coated wire size: 9 gauge.
4. Selvages: Knuckle top and bottom.
5. One piece fabric for heights to 12 feet

**B. Fence Posts, Rails and Braces**

1. Provide round steel pipe in conformance with ASTM F1043, Material Group IC - Industrial Fence.
2. For fence requiring slats or screening, provide round steel schedule 80 pipe in accordance with ASTM F1083.
3. Provide ASTM F1043 Type A zinc coating external and internal.
4. Pipe sizes:

**FENCE POST CLASSIFICATION TABLE**

<b>Type of Post</b>	<b>Wire Height</b>	<b>Outside Diameter</b>	<b>Min. Wt. per L.P. Post Material</b>
Line	Over 10' to 12'	X-C-11 roll formed	2.73 lbs. Galv. Coated Steel
Line	Over 4' to 12'	2 1/2" OD	3.65 lbs. Galv. Steel
Terminal	Over 12'	4" OD	9.10 lbs. Galv. Steel
Gate	7' or less single panel	3" OD	5.79 lbs. Galv. Steel

**C. Tension Wire**

1. Provide 7 gauge coiled spring wire zinc-coated steel, Class 3 coating.

**D. Fittings**

1. Provide materials, coatings and inspections in accordance with ASTM F626.
2. Match fitting material and coatings with protective coatings for fence posts, rails and brace materials.

E. Gates

1. Provide swing gates in accordance with ASTM F900.
2. Provide slide (roller) gates in accordance with ASTM F1184.
3. Gate fabric to be same as fence fabric.
4. Hardware:
  - a. Provide pressed steel or malleable iron.
  - b. Galvanize in accordance with ASTM A153.
  - c. Non-lift type hinge, 180° swing, one pair per leaf.
  - d. Latch: Forked type or plunger-bar type for padlock
  - e. Provide keeper with automatic engagement when gate is open and manual release.
  - f. Provide mushroom or flat plate stops anchored in concrete and accept center drop or plunger bar with padlock eye.
5. Gate frame shall be 2" OD pipe, nominal weight 2.72 lbs./ft., hot dipped galvanized and shall conform to the latest ASTM F669 and A569. Welded corner construction. Double swing gate shall have a center plunger rod with double latch and semi-automatic outer catches.

**2.02 ACCESSORIES**

- A. Zinc coated in accordance with ASTM A153.
- B. Stretcher Bars
  1. Cross section: 3/16-inch by 3/4-inch.
  2. Length: One piece equal to fabric height.
- C. Diagonal Truss
  1. 3/8-inch diameter rod with adjustable take-up.
- D. Hog Rings: 11 gauge.
- E. Bands: Minimum 14 gauge, 3/4 inches wide



## **2.03 CONCRETE**

- A. Class "B" concrete conforming to these specifications.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Install fence in accordance with ASTM F567 except as modified herein.
- B. Unless indicated otherwise, provide a top rail and bottom tension wire.

### **3.02 INSTALLATION**

- A. Corner, Pull, End and Gate Posts
  1. Set all corner, pull, end and gateposts in concrete.
  2. Drill footing holes vertical and smooth in undisturbed or compacted soil.
  3. Provide postholes four times the largest cross section of the post.
    - a. Post depth:
      - (1) Minimum 60 inches for gate, corner, end, and pull posts.
      - (2) Minimum 42 inches for stops and keepers.
      - (3) Add 3 inches of depth for each foot over 6 feet.
- B. Line Posts
  1. Drive line posts in place to a minimum depth of 42 inches.
- C. Post Spacing
  1. Maximum Spacing: 10 feet.
  2. Install corner posts where fence changes direction more than 15 degrees.
  3. Install pull posts at maximum spacing of 300 feet on straight runs of fence.
- D. Framing
  1. Run top rail continuously through line post caps with expansion and contraction joint couplings in top rail at intervals recommended by fence manufacturer but not to exceed a spacing of every 100 feet.
  2. Provide bracing and diagonal trusses at all corner, end, pull, and gateposts.

3. Diagonally truss all gate leafs wider than 4 feet.

E. Fabric and Tension Wire

1. Install on security side of fence and pull taut before fastening. Install approximately 2” between finish grade and bottom of selvage and anchor to framework so that fabric remains under tension after pulling force is released.
2. Tie tension wire to all posts. Install within 6 inches of fabric and tie to each post.
3. Fasten fabric as follows:
  - a. Line Posts: Tie wire 12 inches on center.
  - b. Top Rails and Bracing: Tie wire 15 inches on center.
  - c. Tension Wire: Hog rings 24 inches on center.
4. Provide stretcher bars at following locations:
  - a. One per gatepost and end post.
  - b. Two per corner and pull post.
  - c. Two per gate leaf.
  - d. Thread through fabric and attach to posts or framing with steel bands 15 inches on center.
  - e. Pull posts so posts are plumb when diagonal rod is under proper tension.

F. Gates

1. Install gates according to manufacturer’s instruction, plumb, level and secure for full opening without interference.

G. Adjusting and Finishing

1. Level and plumb finished fence.
2. Adjust gates providing smooth operation.

**END OF SECTION**

**SECTION 32 92 00**  
**TOPSOIL, TURF AND GRASSES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Site Preparation
  - 2. Topsoiling
  - 3. Fertilizing
  - 4. Seeding
  - 5. Sodding
  - 6. Mulching
  - 7. Maintenance and Monitoring

**1.02 REFERENCES**

- A. Association of Official Seed Analysis (AOSA)  
AOSA Rules for Testing Seeds
- B. American Society for Testing and Materials  
ASTM D5268 Standard Specification for Topsoil Used for Landscaping Purposes
- C. Wisconsin Department of Agriculture, Trade and Consumer Protection (ATCP)  
ATCP Chapter 20 Noxious Weed Seed Content and Labeling  
ATCP Chapter 40 Fertilizer and Related Products
- D. Wisconsin Erosion Control Product Acceptability List (PAL)
- E. USDA Natural Resource Conservation Service (NRCS)  
NRCS Specified Soil Types

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Action Submittals
  - 1. Imported Topsoil
    - a. Provide topsoil analysis performed in accordance with ASTM D5268 and demonstrating the topsoil meets Natural Resource Conservation Service (NRCS) specified soil types.
    - b. Submit results of tests for nutrient levels and provide recommendations for fertilizer type and application.
  - 2. Fertilizer
    - a. Furnish certification from supplier attesting to: Brand name, chemical analysis, and guarantee of analysis.
  - 3. Seed
    - a. Furnish certification of conformance with AOSA "Rules for Testing Seed" and attest to: Mix, age, weed content, purity, and germination.
  - 4. Sod
    - a. Certification of sod grass composition, place of origin and date of cut.
- B. Informational Submittals
  - 1. Submit all tags from seed bags / containers.
  - 2. Submit two (2) full sets of manufacturer’s literature and installation instructions for each erosion mat product prior to installation.

## **1.05 QUALITY ASSURANCE**

- A. Test seed according to the methods and procedures used for sampling and analyzing seed for purity, germination, and noxious weed seed content specified in the current addition of the AOSA Rules for Testing Seed.

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

- A. Store any seed delivered before use in a way that protects it from damage by heat, moisture, rodents, or other causes. Discard and replace any seed that becomes damaged.

## **PART 2 - PRODUCTS**

### **2.01 TOPSOIL**

- A. Imported Topsoil
  - 1. Topsoil shall be Soil Class F-1 as required by these specifications. Furnish topsoil consisting of loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils adapted to sustain plant life, and ensure this topsoil is in a pH range of 6.0 to 7.0.
- B. Salvaged Topsoil
  - 1. Topsoil salvaged from the project site may be used to restore lawn areas provided that the soil meets the requirements of paragraph A.1 above. If the volume of salvaged topsoil is not sufficient to restore all areas to the required depths, imported topsoil is required.
- C. Pulverize imported and salvaged topsoil completely breaking down all clods and lumps. The material shall be free of rocks, twigs and other foreign material. 100% of the material shall pass a one-inch sieve and at least 90% shall pass the No. 10 sieve (0.08 inch).

### **2.02 SEED**

- A. General Requirements
  - 1. Conform to chapter ATCP 20 regarding noxious weed seed content and labeling.
  - 2. Use seed within one year of the test date appearing on the label.
- B. Lawn Type Turf
  - 1. All lawn areas restored with topsoil, unless shown otherwise on Drawings, shall be seeded with grass seed meeting the following requirements:

Species	Purity Minimum %	Germination Minimum %	Mixture Proportions in Percent
Kentucky Bluegrass	98	85	35
Red Fescue	97	85	20
Hard Fescue	97	85	20
Improved Fine Perennial Ryegrass	96	85	25

### 2.03 FERTILIZER

- A. Furnish fertilizers for seeding and sodding that are standard commercial packaged or bulk products in granular or liquid form conforming to ATCP Chapter 40.
- B. Each container of packaged fertilizer must be plainly marked with the analysis of the contents showing minimum percentages of total nitrogen, available phosphoric acid and soluble potash. Provide an invoice for each bulk material shipment indicating the minimum percentages of total nitrogen, available phosphoric acid and soluble potash in the contents.
- C. Furnish fertilizer meeting the following minimum requirements:
  - 1. Nitrogen, not less than 16%.
  - 2. Phosphoric Acid, not less than 6%.
  - 3. Potash, not less than 24%.
  - 4. The total of nitrogen, phosphoric acid and potash shall equal at least 50%.
  - 5. Fertilizer shall contain no phosphorus.

### 2.04 MULCH

- A. Mulch shall consist of straw or hay which are free of noxious weeds and other objectionable foreign matter.
- B. Furnish mulch binder (tackifier) as specified within the current Wisconsin Erosion Control Product Acceptability List (PAL).

### 2.05 SOD

- A. The sod shall consist of a dense, well rooted growth of permanent and desirable grasses, indigenous to the general locality where it is to be used.

- B. Sod shall meet the following general requirements:
  - 1. Free from weeds and undesirable grasses.
  - 2. Grass length of 2 inches.
  - 3. Cut in uniform strips 18 inches by 72 inches.
  - 4. Uniform thickness of 1½ inches or more.
  - 5. Adequately watered to prevent crumbling, breaking, or tearing during handling and placement.

## **2.06 EROSION MAT**

- A. Furnish erosion mat materials as specified within other sections of these specifications, within the current Wisconsin Erosion Control Product Acceptability List (PAL), and as indicated on the Drawings.

## **PART 3 - EXECUTION**

### **3.01 SITE PREPARATION**

- A. Grade subgrade to a uniform depth accommodating specified topsoil thicknesses in accordance with the following:
  - 1. Seeded Areas – Four (4) inches
  - 2. Sod Areas – Three (3) inches

### **3.02 TOPSOILING**

- A. After preparing and finishing the areas designated for topsoil to the required lines, grades, slopes and cross-sections, place and spread the topsoil to a uniform depth as follows:
  - 1. Seeded Areas – Four (4) inches settled
  - 2. Sod Areas – Three (3) inches settled
- B. Break down all clods and lumps using the appropriate equipment to provide a uniformly textured soil.
- C. Remove rocks, twigs, foreign material and clods that cannot be broken down. Dress the entire surface to present a uniform appearance.
- D. Topsoil shall not be compacted.

- E. Just before seeding, work the area being seeded with discs, harrows, or other appropriate equipment to obtain a reasonably even and loose seedbed.

### **3.03 SEEDING**

#### **A. Broadcast Seeding**

1. Utilize a machine or combination of machinery intended for seed sowing and which will produce the following:
  - a. Apply seed uniformly at the rate specified.
  - b. Cover seed with approximately ¼ inch of topsoil.
  - c. Roll lightly.
  - d. Apply seed at right angles to surface drainage.
2. If broadcasting by hand, perform this work with satisfactory hand seeders and only when the air is calm enough to prevent seeds from blowing away.

#### **B. Hydroseeding**

1. The hydroseeding machine shall have a built-in agitation system and operating capacity as sufficient to agitate, suspend and homogeneously
2. mix a slurry containing seed, fertilizer, mulch and tackifier sufficient to meet or exceed minimum application rates. All materials shall be compatible with the hydroseeding process.
3. During application, contain the hydroseeding mixture to within the required areas. Excessive overspray on sidewalks, roadways, private property, etc. shall be cleaned.

### **3.04 FERTILIZING**

- A. Uniformly apply the fertilizer selected for the seeding areas and incorporate into the soil by light discing or harrowing. If applying granular fertilizer, ensure it is well pulverized and free from lumps.
- B. If incorporating fertilizer into topsoiled areas, the contractor may apply it just before, and in conjunction with, final discing or harrowing, or if hand manipulating the topsoil, apply it just before final raking and leveling.



- C. If sowing seeding areas by hydroseeding, then fertilize by placing the required quantity of fertilizer in the tank, mixing with the water and the seed, agitating constantly, and apply during the seeding operation. If applying fertilizer this way then discing and harrowing after placement is not required.
- D. If fertilizing areas to receive sod, spread the fertilizer uniformly over the soil before sodding at the rate specified, and then work the fertilizer into the soil while preparing as specified for preparing the earth bed.

### **3.05 APPLICATION RATES**

- A. Seeding
  - 1. Four (4) pounds per 1,000 square feet.
- B. Fertilizer
  - 1. Seven (7) pounds per 1,000 square feet.

### **3.06 MULCHING**

- A. Unless directed otherwise, place the mulch on the seed areas within two (2) days after completing the seeding. Place straw or hay uniformly over the area 1 to 1 ½ inches deep, using 2 to 3 tons of mulch per acre. Do not perform mulching during periods of excessively high winds that may prevent proper mulch coverage. Place the mulch loosely or open enough to allow some sunlight to penetrate and air to slowly circulate, but thick enough to shade the ground, conserve soil moisture, and prevent or reduce erosion. Maintain the mulched areas and repair all areas damaged by wind, erosion, traffic or other causes.
- B. Secure mulch by using one of the following methods:
  - 1. Method "A":
    - a. Secure mulch with heavy twine or netting.
      - (1) Twine to be fastened with pegs or staples to form a grid of 6- to 10-foot spacing.
  - 2. Method "B":
    - a. Treat straw or hay with a tackifier, blow from a machine, and uniformly deposit over seeded areas in one operation. Use a machine intended for the purpose of mulch application that blows or ejects by constant air stream a controlled quantity of mulch and applies a spray of tackifier to partially coat the straw or hay, sufficient to hold together and keep in place the deposited mulch

material. Throughout the process, feed the mulch material into the blowing machine to produce a constant and uniform ejection from the discharge spout, and operate in a position to produce mulch of uniform depth and coverage.

3. Method "C":
  - a. Immediately after spreading mulch, anchor in the soil by using a mulch crimper consisting of a series of dull, flat discs with notched edges. Equip the crimper with a ballast compartment to allow adjusting the weight for depth control.
  - b. Impress the mulch into the soil 1 ½ to 2 ½ inches deep in one pass of the crimper. Mulch crimpers are not to operate on steep slopes that may cause damage to the mulch, seedbed, or soil.

### **3.07 EROSION MAT**

- A. Install erosion mat as directed on construction drawings.
- B. Install erosion mat materials as recommended by the product manufacturer(s) installation guidelines.
- C. Erosion mat may also be placed within none required areas to improve grass seed germination and growth at the Contractor's discretion and cost.

### **3.08 SODDING**

- A. Placing Sod
  1. Moisten topsoil to loosened depth of 3 inches.
  2. Place sod within 24 hours after initially cut.
  3. Laying sod strips:
    - a. Lay sod to abutting end joints are not continuous.
    - b. Sod strips shall abut snugly against each other.
    - c. Sod shall be level with adjoining turf or grade.
    - d. Water and roll or lightly tamp sod immediately after placement.
    - e. At the limits of the sodded area, end strips shall be staggered.

- f. At the end of all sod strips, turn sod into soil, cover with topsoil, and compact.
  - 4. Laying sod on slopes and in waterways:
    - a. In waterways, place sod with longer dimension perpendicular to water flow.
    - b. On slopes, place sod with longer dimension parallel to the contours of the ground.
- B. Staking Sod
  - 1. Stake sod in all waterways and on all slopes steeper than 1 foot vertical to 4 feet horizontal.
  - 2. Stakes shall be wood lath minimum of 12 inches long.
  - 3. Pace stakes on top edge of sod strip and drive plumb through sod to point approximately flush with sod.
  - 4. Space stakes 18 inches to 36 inches apart depending on the nature of the soil and the steepness of the slope.

### **3.09 RESTORATION TIMETABLE**

- A. Weather permitting, seeding and sodding may be performed at any time during the growing season when soil conditions are suitable.
- B. All lawn restoration work in areas constructed during winter months shall be completed by May 15<sup>th</sup> of that year. All lawn restoration work in areas constructed after May 15<sup>th</sup> shall be completed in accordance with Paragraph A above.

### **3.10 MAINTENANCE AND MONITORING**

- A. Seeded Areas:
  - 1. Maintain all seeded areas performed under this contract, which includes the destroying of weeds within the seeded areas by cutting, or by other means, and preventing the weed plants from maturing to the bloom or flower stage. The term “weeds” as defined here shall constitute plant life other than those included within the seed mixture specified.
  - 2. Maintain and monitor seeded areas upon initial seeding and throughout the Correction Period to ensure uniform and consistent growth of the specified seed, as determined by the Owner. Water seeded areas as required to

establish proper growth. Fully established growth will be determined when average seed growth coverage is a consistent 85% of the seeded area with uniform density and color, is capable of resisting erosion, and growth is a minimum height of 3”.

B. Sodded Areas:

1. All sodded areas shall be kept thoroughly moist by watering or sprinkling, when rainfall is deficient, for a minimum period of 30 days or until sod is thoroughly established.
2. Contractor shall be responsible for re-sodding restored areas due to rainfall events, erosion, and unsatisfactory establishment of sod until Owner/Engineer deems the restoration sod work fully established and dense.

C. The cost of providing maintenance and monitoring will be considered incidental to other Work items within this section.

**END OF SECTION**

**SECTION 33 05 05.30**  
**TESTING UTILITY PIPELINES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Lamp Testing

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM D3034 Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
  - ASTM C828 Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Line.
  - ASTM F679S Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
  - ASTM C1244 Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
  - ASTM C1107 Spec. for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- B. American Water Works Association (AWWA)
  - AWWA C600 Installation of Ductile-Iron Water Mains and Their Appurtenances
  - AWWA C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
  - AWWA C651 Disinfecting Water Mains
  - AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 in. through 63 in., for Water Distribution and Transmission

**1.03 SUBMITTALS**

- A. Informational Submittals
  - 1. Field or Site Quality Control Submittals
    - a. Test reports and results.
    - b. Proposed method to correct deficiencies.
    - c. Record of deficiency repair method and location.

## **PART 2 - PRODUCTS**

### **2.01 EQUIPMENT**

- A. Gravity Sewer Lamping
  - 1. Battery operated light.
  - 2. Mirror.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Clean pipeline of any debris, soils, and construction material.
- B. Repair or replace piping, fittings, manholes, and other parts of the piping system that have visible defects or leakage before commencing tests, even though amount of leakage or pressure loss may be below the allowable limit.
- C. Provide traffic control and other safety equipment including confined space entry equipment, if required.

### **3.02 LAMP TESTING**

- A. Whether televised or not, lamp gravity pipelines, record the results and furnish results to the Engineer.
- B. Check vertical and horizontal alignment by sighting through newly constructed pipeline after illuminating opposite end with a flashlight.
- C. Light beam should be full throughout the section, but no less than two-thirds full under any circumstances.
- D. Relay any section of pipe found to be out of alignment.

**END OF SECTION**

**SECTION 33 05 19**  
**DUCTILE IRON UTILITY PIPE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Push-on joint pipe and fittings.
  - 2. Mechanical joint pipe and fittings.
- B. The products described are not installed under this Section.

**1.02 REFERENCES**

- A. American Water Works Association (AWWA):
  - AWWA C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
  - AWWA C110 Ductile-Iron and Gray-Iron Fittings
  - AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
  - AWWA C115 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
  - AWWA C116 Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
  - AWWA C151 Ductile-Iron Pipe, Centrifugally Cast
  - AWWA C153 Ductile-Iron Compact Fittings
  - AWWA C600 Installation of Ductile-Iron Water Mains and their Appurtenances
  - AWWA C606 Grooved and Shouldered Joints
- B. American Society for Testing and Materials (ASTM)
  - ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength
- C. National Sanitation Foundation (NSF)
  - NSF 61 Drinking Water System Components – Health Effects

**1.03 SUBMITTALS**

- A. Action Submittals
  - 1. Product Data
    - a. Submit pipe fitting and joint details

B. Informational Submittals

1. Certificates

- a. Submit manufacturer's certification that materials delivered comply with the requirements of this section and the referenced standard.

2. Manufacturers' Instructions

- a. Submit recommendations for installation of pipe and fittings.

**1.02 QUALITY ASSURANCE**

A. Certifications

1. Provide manufacturer's certification that materials delivered comply with the requirements of this section and the referenced standard.

**1.03 DELIVERY, STORAGE, AND HANDLING**

A. Delivery and Acceptance Requirements

1. Pipe shall be available to Engineer for inspection.
2. Upon delivery ensure that each pipe is clearly marked with the following information:
  - a. Weight.
  - b. Class or nominal thickness.
  - c. Casting period.
  - d. Manufacturer's mark.
  - e. Country where cast.
  - f. Year the pipe was produced
  - g. Letters "DI" or "DUCTILE".
3. Reject pipe not clearly marked with the above information.
4. Reject damaged pipe.
5. Reject damaged coating.
6. Reject damaged lining.



- B. Storage and Handling Requirements
  - 1. Provide handling and storage in accordance with AWWA C600.
  - 2. Load and unload pipe and fittings by lifting with lift hoists, fork truck, or other suitable lifting device.
  - 3. Do not drop material.
  - 4. Do not roll or skid pipe against another pipe.
  - 5. Provide padded slings, hooks, or pipe tongs to prevent damage to the exterior surface or internal lining of the pipe and fittings.
  - 6. Store so pipe remains free of dirt and foreign material.
  - 7. Store bolts and accessories in a dry location without intermingling types and sizes.

## **PART 2 - PRODUCTS**

### **2.01 DUCTILE IRON PIPE MATERIALS**

- A. Acceptable Manufacturers: US Pipe, American or McWane
- B. The raw material for ductile iron may have an average minimum content consisting of 90% recycled iron and steel. Ductile iron pipe shall be manufactured in the USA in accordance with ANSI/AWWA C151/A21.51.
- C. Exterior Coating
  - 1. Asphaltic coating, minimum of 1 mil thick.
- D. Interior Lining
  - 1. Fusion-bonded epoxy in accordance with AWWA C116 where shown on the Drawings or specified elsewhere.
  - 2. For buried potable water service, provide standard thickness of cement-mortar conforming with AWWA C104.
  - 3. Do not provide an interior lining for air service piping.
- E. Minimum Pipe Thickness and Pressure
  - 1. Push-on, push-on restrained joint and mechanical joint
    - a. Special Thickness Class 52

- b. Pressure Class 350 – can be used only when saddles are used for tapping pipe.

## 2.02 PIPE JOINT MATERIALS

### A. Push-on:

- 1. Provide conforming to AWWA C111.
- 2. Gaskets
  - a. Provide plain rubber for wastewater and water to temperatures not exceeding 150°F.
  - b. Provide gaskets suitable for chlorinated water (when required for potable water service).
  - c. Provide EPDM for air service.
  - d. Provide Buna-N Nitrile (NBR) in petroleum contaminated soils.
- 3. Use below ground except for connection to fittings, valves, hydrants and other similar conditions.

### B. Mechanical Joint

- 1. Provide conforming to AWWA C111.
- 2. Joints shall include:
  - a. Ductile or gray iron follower gland.
  - b. Provide corrosion resistant tee-head bolts and hexagonal nuts, low strength, high alloy steel with ceramic filled, baked on fluorocarbon resin in compliance with AWWA C111/A21.11; Cor-Blue.
  - c. Provide 304 stainless steel tee-head bolts and hexagonal nuts with an anti-seize mechanism.
  - d. Gaskets
    - (1) Provide plain rubber gasket for sewer and water to temperatures not exceeding 150°F.
    - (2) Provide EPDM for air service.
    - (3) Provide Buna-N Nitrile (NBR) in petroleum contaminated soils.

- C. For use below grade:
  - 1. Standard ductile iron mechanical joint conforming to AWWA C110 or compact ductile iron mechanical joint conforming to AWWA C153.
- D. For use within manholes, structures or above grade:
  - 1. Ductile iron flanged joint conforming to AWWA C110.
- E. Exterior Coatings
  - 1. Asphaltic coating, minimum of 1 mil thick.
  - 2. Fusion-bonded epoxy in accordance with AWWA C116.
- F. Interior Lining
  - 1. Standard thickness of cement-mortar conforming with AWWA C104.
  - 2. Fusion-bonded epoxy in accordance with AWWA C116 where shown on the Drawings or specified elsewhere.
  - 3. For sludge and scum service, provide Permox CTF amine cured novalac epoxy containing at least 20% by volume of ceramic quartz, with nominal of 40 mils DFT. Provide lining on direct, bare ductile, after surface prep in accordance with NAPF 500-03-01 and NAPF 500-03-04. Do not provide interior lining for air service lines.

**PART 3 - EXECUTION (NONE)**

**END OF SECTION**

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**SECTION 33 05 27**  
**CORRUGATED METAL UTILITY PIPE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Circular corrugated steel pipe.
  - 2. Flared end sections.
- B. The products described are not installed under this Section.

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM A760 Standard Specification for Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains.
- B. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO M36 Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.
  - AASHTO M 274 Standard Specification for Steel Sheet, Aluminum-Coated (Type 2), for Corrugated Steel Pipe

**1.03 SUBMITTALS**

- A. Action Submittals
  - 1. Shop Drawings
    - a. Submit shop drawings for sectional plate pipe, sectional plate arches, or sectional plate pipe arches.
    - b. Include shop detail, erection, and other drawings showing dimensions, sizes of material, details, and other information necessary for the complete fabrication and erection of the metal work.
- B. Informational Submittals
  - 1. Certificates

- a. Submit manufacturer's certification that materials delivered comply with the requirements of this section and the referenced standard.
2. Manufacturers' Instructions
  - a. Submit recommendations for installation of pipe and fittings.

#### **1.04 QUALITY ASSURANCE**

##### **A. Certifications**

1. Provide manufacturer's certification that samples representing each lot have been tested and inspected in accordance with ASTM A760/AASHTO M36 and have been found to meet the requirements for material required per this Specification Section.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

##### **A. Delivery and Acceptance Requirements**

1. Package pipe and fittings to prevent damage during shipping.
2. Use lifts for loading or unloading to avoid shock.
3. Do not drop materials.
4. Do not drag pipe or strike with hard objects which could scratch coatings.
5. Inspect pipe and pipe fittings when delivered to the site and prior to installation.
6. Reject pipe for any of the following:
  - a. Uneven laps.
  - b. Variation from a straight centerline of more than ½ inch.
  - c. Ragged or diagonal sheared edges.
  - d. Loose bolts or rivets.
  - e. Fasteners which are unevenly lined.
  - f. Poorly formed seams.
  - g. Illegible brand marking.
  - h. Poorly formed seams.

- i. Dents or bends in the metal.
  - j. Elliptical shape on round pipe.
    - (1) The average inside diameter of the pipe shall not vary more than ½ inch or 1 percent, whichever is greater.
    - (2) Measure on the inside crest of the corrugations.
    - (3) Clearly mark rejected pipe as “REJECTED” with OSHA yellow paint.
- B. Storage and Handling Requirements
- 1. Provide safe storage for material.
  - 2. Store materials to keep free from dirt and foreign matter.
  - 3. Store fittings in a manner that will allow drainage and protect from freezing.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Pipe Material
- 1. Mark each piece of pipe as follows:
    - a. Manufacturer’s name or trademark.
    - b. Date of manufacture.
    - c. Pipe size.
  - 2. Helical corrugated steel pipe material manufactured and fabricated in accordance with ASTM A760/AASHTO M36 Aluminized Steel.
  - 3. Metallic Coating – AASHTO M 274 Aluminized Steel Type 2.
  - 4. Circular pipe shall be Type I.
  - 5. Arch pipe shall be Type II.
  - 6. Perforated pipe shall be Type III, Class 1.
  - 7. Corrugation size 2-<sup>2</sup>/<sub>3</sub>” x ½” for pipe sizes 12” diameter through 84” diameter.

- a. Material sheet thickness:
    - (1) 6" diameter - .052 inches
    - (2) 8" diameter to 24" diameter - .064 inches
    - (3) 30" diameter to 36" diameter - .079 inches
    - (4) 42" diameter to 54" diameter - 0.109 inches
    - (5) 60" diameter to 72" diameter - 0.138 inches
    - (6) 78" diameter to 96" diameter - 0.168 inches
  - 8. Corrugation size 5" x 1" for pipe sizes 48" diameter through 144" diameter.
    - a. Material sheet thickness:
      - (1) 48" diameter to 60" diameter - 0.064 inches
      - (2) 66" diameter to 96" diameter - 0.079 inches
      - (3) 102" diameter to 120" diameter - 0.019 inches
      - (4) 126" diameter to 144" diameter - 0.138 inches
  - 9. Flared end sections shall meet the same requirements as the connecting pipe.
- B. Gaskets
- 1. Band of expanded rubber in accordance with ASTM A760/AASHTO M36.
- C. Band Connectors
- 1. Corrugations to match the pipe sections in accordance with ASTM A760/AASHTO M36.
- D. Coating
- 1. Metallic Coating – AASHTO M 274 Aluminized Steel Type 2.

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 33 05 31**  
**THERMOPLASTIC UTILITY PIPE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Polyvinyl Chloride (PVC) Gravity Sewer Pipe
  - 2. Polyvinyl Chloride (PVC) Pressure Pipe (AWWA C900 CIPS)
- B. The products described are not installed under this Section.

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM D1784 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
  - ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
  - ASTM D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
  - ASTM D2466 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
  - ASTM D2467 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
  - ASTM D2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems
  - ASTM D2665 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
  - ASTM D2672 Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement
  - ASTM D2855 Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets
  - ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
  - ASTM D3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
  - ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
  - ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

ASTM F679	Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fitting
ASTM F1336	Standard Specification for Poly (Vinyl Chloride) (PVC) Gasketed Sewer Fittings
ASTM F1866	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Schedule 40 Drainage and DWV Fabricated Fittings

B. American Water Works Association (AWWA)

AWWA C104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
AWWA C110	Ductile-Iron and Gray-Iron Fittings
AWWA C111	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C153	Ductile-Iron Compact Fittings
AWWA C900	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)

### 1.03 SUBMITTALS

A. Action Submittals

1. Product Data

- a. Provide product data sheets for all pipe and fittings.

B. Informational Submittals

1. Certificates

- a. Certification of production date of all materials.
- b. Manufacturer's certification that the materials delivered were manufactured, sampled, tested, and inspected in accordance with this specification and appropriate referenced standards.

2. Manufacturers' Instructions

- a. Manufacturer's recommendations for assembly and installation.

### 1.04 QUALITY ASSURANCE

A. Certifications

1. Provide manufacturer's certification that materials delivered comply with the requirements of this section and the referenced standard.

## 1.05 DELIVERY, STORAGE, AND HANDLING

### A. Delivery and Acceptance Requirements

1. Pipe shall be available to Engineer for inspection.
2. Inspect the pipe shipment to identify shifted loads, broken packaging or rough treatment, which could be an indication of damage.
3. Upon delivery insure that each pipe is clearly marked with the following information:
  - a. Manufacturer's name, trademark or logo.
  - b. Nominal size.
  - c. PVC cell classification.
  - d. Pipe stiffness designation, dimension ratio or schedule size and pressure class.
  - e. ASTM or AWWA specification designation.
  - f. National Sanitation Foundation approval (pipe for potable water).
  - g. Production date.
4. Reject pipe not clearly marked with the above information.
5. Reject damaged pipe.
6. Reject pipe if any of the following is identified:
  - a. Pitted or cratered.
  - b. Flaking.
  - c. Straightness varies more than ½ inch in 10 feet.
  - d. Any defect which prevents assembly according to manufacturer's recommendations.
  - e. Not utilized within one year of date of production.

### B. Storage and Handling Requirements

1. Unload the pipe in a manner which will not put stress on the pipe or strike anything causing damage.

2. Place and store the pipe package units on level ground stacked no more than 8 feet high. Do not store close to heat sources.
3. Store gaskets away from excessive exposure to heat, direct sunlight, ozone, oil or grease.
4. Store solvent cement in tightly sealed containers away from excessive heat.
5. Handle pipe in a manner to prevent impact blows, abrasion damage, gouging or cutting.
6. When handling pipe in cold weather, provide additional care to prevent damage due to impact. Impact strength is reduced in cold weather.

## **PART 2 - PRODUCTS**

### **2.01 POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE MATERIALS**

#### **A. Mainline Gravity Sewer Pipe**

1. Pipe, fittings and repair couplings shall be manufactured and tested in accordance with the following standards:
  - a. Sizes 8 inch through 15 inch and depths up to 25 feet: ASTM D3034, PSM SDR-35 PVC.
  - b. Sizes 8 inch through 15 inch and depths greater than 25 feet: ASTM D3034, PSM SDR-26 PVC.
  - c. Sizes 18 inch through 48 inch and depths up to 25 feet: ASTM F679, PS46 PVC, T-1 minimum cell classification.
2. Elastomeric Gaskets: Conform to ASTM F477
3. Elastomeric Joints: Conform to ASTM D3212
4. Solvent Weld Joints: Not permitted.
5. Repair Couplings
  - a. Repair couplings for PVC SDR-35 pipe to PVC SDR-35 pipe shall comply with ASTM 3034, PSM SDR-35 PVC and gasketed joints complying with ASTM F1336 with stops.
  - b. Repair couplings for transition between ABS composite pipe and PVC shall be Fernco eccentric couplings with stainless steel shear rings, bands, nuts and housings.

- B. Sewer Services
  - 1. Manufactured and tested in accordance with ASTM D2665.
  - 2. Fittings to conform to ASTM F1866.
  - 3. Pipe for sizes 4-inch and 6-inch: Schedule 40
  - 4. Solvent Weld Joints: ASTM D2672
  - 5. Solvent Cements: ASTM D2564

**2.02 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE POTABLE MATERIALS (AWWA C900 CIPS)**

- A. Pipe shall conform to AWWA C900 pressure class 235 psi, thickness class DR 18.
- B. Elastomeric gaskets shall be manufactured in conformance to ASTM F477.
- C. Joints shall conform to ASTM D3139
- D. Fittings
  - 1. Ductile Iron Fittings
    - a. Standard ductile iron mechanical joint conforming to AWWA C110 or compact ductile iron mechanical joint conforming to AWWA C153.
    - b. For buried potable water service, provide standard Cement mortar lined conforming to AWWA C104.
    - c. Fusion-bonded epoxy in accordance with AWWA C116 where shown on the Drawings or specified elsewhere. Rubber gasket joints conforming to AWWA C111.
    - d. Provide gaskets suitable for chlorinated water (when required for potable water service).
    - e. Tee-head bolts and hexagonal nuts shall be corrosion resistant, low strength, high alloy steel with ceramic filled, baked on fluorocarbon resin in compliance with AWWA C111/A21.11; Cor-Blue.

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 33 05 33.23**  
**POLYETHYLENE PRESSURE PIPE AND TUBING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Polyethylene Pressure Pipe 3 Inch and Smaller Pipe and Tubing
- B. The products described are not installed under this Section.

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM D638 Standard Test Method for Tensile Properties of Plastics
  - ASTM D1238 Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
  - ASTM D1505 Standard Test Method for Density of Plastics by the Density-Gradient Technique
  - ASTM D1598 Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure
  - ASTM D1599 Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fitting
  - ASTM D2122 Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
  - ASTM D2290 Standard Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe
  - ASTM D2837 Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
  - ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
  - ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
  - ASTM F2206 Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE)
  - ASTM F2880 Standard Specification for Lap-Joint Type Flange Adapters for Polyethylene Pressure Pipe in Nominal Pipe Sizes 3/4 in. to 65 in.
- B. American Water Works Association (AWWA)
  - AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. (19 mm) Through 3 In. (76 mm), for Water Service

AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 65 In. (100 mm Through 1,650 mm), for Waterworks

### **1.03 SUBMITTALS**

#### **A. Action Submittals**

##### **1. Product Data**

- a. Provide product data sheets for all pipe and fittings.

#### **B. Informational Submittals**

##### **1. Certificates**

- a. Certification of production date of all materials.
- b. Manufacturer's certification that the materials delivered were manufactured, sampled, tested, and inspected in accordance with this specification and appropriate referenced standards.

#### **C. Manufacturers' Instructions**

1. Manufacturer's recommendations for assembly and installation.

### **1.04 QUALITY ASSURANCE**

#### **A. Certifications**

1. Provide manufacturer's certification that materials delivered comply with the requirements of this section and the referenced standard.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

#### **A. Delivery and Acceptance Requirements**

1. Upon delivery inspect pipe and fittings for damage, cracks, holes, or foreign inclusions.
2. Check date of production to verify the pipe will be installed within one year of date of production.
3. Reject damaged pipe material and pipe not installed within one year of date of production.

#### **B. Storage and Handling Requirements**

1. Store pipe and accessories on flat level ground with no rocks or other objects under the pipe.



## **PART 2 - PRODUCTS**

### **2.01 POLYETHYLENE PRESSURE PIPE MATERIALS 3 INCH AND SMALLER**

- A. Pipe shall be high density polyethylene (HDPE) meeting the requirements of AWWA C901 standards.
  - 1. Materials used for the manufacture of the HDPE pipe shall be made from a PE 4710 resin compound conforming to ASTM D3350 minimum Cell classification 445574C.
  - 2. HDPE pipe shall be rated for use at a pressure class of 250 psi (DR 9) unless otherwise shown on the Engineered Plans or stated in the Bid Schedule.
  - 3. Pipe shall be iron pipe size outside diameter.
  - 4. Pipe shall be installed within one year of the production date.
- B. Fittings
  - 1. Butt Fusion Fittings
    - a. Molded and fabricated fittings shall be high density polyethylene (HDPE) meeting the requirements of AWWA C901 standards.
    - b. HDPE fittings shall be made of the same materials and at the same pressure class as the pipe.
      - (1) Molded fittings shall be manufactured, tested and marked in accordance to ASTM D3261.
      - (2) Fabricated fittings shall be manufactured, tested and marked in accordance to ASTM F2206.
  - 2. Flanges and Mechanical Joint (MJ) Adapters
    - a. Flanges and mechanical joint adapters shall be made of the same materials and at the same pressure class as the pipe.
    - b. Flanged and mechanical joint adapters shall be made in accordance to ASTM D3261
    - c. Mechanical joint adapters shall be used to connect valves and other pipe unless stated otherwise on the Engineered Plans.
    - d. Markings for molded or machined flange adaptors or mechanical joint adaptors shall be per ASTM D3261.

3. Mechanical Fittings for Service Tubing
  - a. Provide metal compression connections with ferrule and compression nut.
  - b. Provide a stainless steel insert stiffener to insert inside the tube.
  - c. Insert fittings shall not be used.
  - d. Mechanical fittings shall be engineered to prevent sliding or rotation.

C. Pipe and Fitting Identification

1. The pipe shall be marked in accordance to the standards to which it is manufactured and as follows:
  - a. Nominal size
  - b. Outside diameter base of iron pipe sizes.
  - c. Dimension ratio
  - d. Manufacturer's name or trademark
  - e. Standard materials designation code
  - f. Cell classification
  - g. Pressure class
  - h. Standard's designation (AWWA C901)
  - i. Manufacturer's production code
  - j. Date of Manufacture
  - k. Mark of certifying agency for potable water (NSF)

D. Color identification by use of stripes on pipe to identify pipe service.

1. Blue for potable water.
2. Green for sewer.

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 33 05 33.30**  
**CORRUGATED HDPE DRAINAGE PIPE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Corrugated, non-perforated HDPE storm sewer pipe material.
  - 2. Corrugated, perforated HDPE drainage pipe material.
- B. Products Furnished or Supplied but not Installed under this Section.

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- B. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe
  - AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

**1.03 SUBMITTALS**

- A. Informational Submittals
  - 1. Certificates
    - a. Submit manufacturer's certification that materials delivered comply with the requirements of this section and the referenced standard.
  - 2. Manufacturers' Instructions
    - a. Submit recommendations for installation of pipe and fittings.

**1.04 QUALITY ASSURANCE**

- A. Certifications
  - 1. Provide manufacturer's certification that samples representing each lot have been tested and inspected in accordance with AASHTO M252 and

AASHTO M294 and have been found to meet the requirements for material required per this Specification Section.

## **PART 2 - PRODUCTS**

### **2.01 HIGH DENSITY POLYETHYLENE PIPE (HDPE)**

- A. Provide in accordance with requirements of AASHTO M294 Type S Pipe and ASTM D3212.
- B. Integral bell & spigot joints shall be watertight according to ASTM D3212. Gaskets shall meet the requirements of ASTM F477.

### **2.02 DRAIN TILE**

- A. Provide drain tile pipe shall be in accordance to AASHTO M252, type CP, and AASHTO M294, type CP, with class 2 perforations.
- B. Geotextile
  - 1. Drain tile shall be wrapped with knitted, woven, or non-woven fibers of polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride geotextile fabric.
  - 2. Provide knitted geotextile wraps that form a seamless sleeve and fit tightly over the pipe.
- C. Drain tile outlets shall be Mitered Drain Model Number 4MD3P-B or 4MD3P-G, manufactured by Mitered Drain, Inc., (Phone 707-620-0606, Fax 707-620-0607, [www.miteredrain.com](http://www.miteredrain.com)).

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

**END OF SECTION**

**SECTION 33 05 39.41**  
**REINFORCED CONCRETE PIPE FOR SEWERS AND CULVERTS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Circular culvert, storm sewer, and pipe.
  - 2. Elliptical culvert and storm sewer pipe.
  - 3. Apron endwalls

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - ASTM C76 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
  - ASTM C443 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
  - ASTM C444 Standard Specification for Perforated Concrete Pipe
  - ASTM C497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
  - ASTM C506 Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe.
  - ASTM C507 Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe.
  - ASTM C877 Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
  - ASTM C990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
  - ASTM C1433 Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers

**1.03 SUBMITTALS**

- A. Action Submittals
  - 1. Shop Drawings
    - a. Provide detailed design of the pipe joints and gasket showing exact dimensions of the joints including permissible tolerances for each size pipe and size, type and locations of gasket materials.

B. Informational Submittals

1. Certificates

- a. Manufacturer's certification that materials have been satisfactorily tested in accordance to ASTM C497.
- b. Manufacturer's certification that culvert box sections and culvert box endwalls conform to ASTM C1433.
- c. Manufacturer's certification that materials for sealing bands conform to ASTM C877.

**1.02 DELIVERY, STORAGE, AND HANDLING**

A. Delivery and Acceptance Requirements

1. Pipe shall be clearly marked with the following information:

- a. Specification designation
- b. Pipe class or strength designation
- c. Date of manufacture
- d. Name or trademark of manufacturer
- e. Plant identification
- f. Letters E or Q indicating elliptical or quadrant reinforcement

2. Inspect and reject pipe for the following defects:

- a. Improper marking.
- b. Fractures or cracks passing through wall, except for a single end crack that does not exceed depth of joint.
- c. Defects indicating non-compliance with proportioning, mixing and molding of the concrete.
- d. Surface defects indicating honeycombed or open texture.
- e. Ends are not normal to the wall and center line of the pipe.
- f. Damaged or cracked ends.
- g. Any continuous crack having a width of 0.01 inch or more and extending for a length of 12 inches or more.

- B. Storage and Handling Requirements
1. Deliver pipe materials to, unload, and distribute adjacent to or near the intended laying location.
  2. Do not drop pipe materials.
  3. Handle pipe materials in a manner intended to prevent damage to the pipe ends or to any coating or lining.
  4. Pipe materials shall not be skidded or rolled against adjacent pipe materials.
  5. Store material to protect from damage and do not stack in layers.
  6. Store gasket materials in a cool place at a temperature less than seventy degrees Fahrenheit (70°F), and in no case stored in the open, or exposed to direct sun rays.

## **PART 2 - PRODUCTS**

### **2.01 REINFORCED CONCRETE CIRCULAR PIPE (RCP)**

- A. Conform to ASTM C76 of the classification stated in the Drawings.
- B. Minimum Class III.
- C. Provide bell and spigot joints conforming to ASTM C443 with flat rubber profile gaskets meeting standard gasket requirements.
- D. Branch fittings such as tees, wyes, etc. and fittings and specials shall be cast as integral parts of the pipe of the same strength class as the attached pipe.

### **2.02 REINFORCED CONCRETE ELLIPTICAL PIPE (RCEP)**

- A. Conform to ASTM C507 of the classification stated on the Drawings.
- B. Minimum Class HE III or Class VE III.
- C. Provide tongue and groove joints with flexible plastic Type B gaskets conforming to AASHTO M198 and joint sealants conforming to ASTM C990.

### **2.03 REINFORCED CONCRETE APRON ENDWALLS**

- A. Conform to the pipe standard and class same as specified for the connecting pipe.
- B. Conform to the specified joints same as specified for the connecting pipe.

## **PART 3 - EXECUTION**

### **3.01 APPLICATION**

- A. Sanitary Sewer: Use circular pipe ASTM C76 "C" wall.
- B. Storm Sewer and Culverts
  - 1. Use circular pipe ASTM C76 "B" or "C" wall unless stated otherwise on Drawings.

**END OF SECTION**



**SECTION 33 05 62**  
**PRECAST CONCRETE MANHOLES AND STRUCTURES**

**PART 1 - GENERAL.**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Precast Reinforced Concrete Manholes
  - 2. Castings
  - 3. Manhole Joint Wrap
  - 4. Manhole Cover Removing Hook
  - 5. Grade Adjusting Rings

**1.02 REFERENCES**

- A. American Concrete Institute (ACI)
  - ACI 318 Building Code Requirements for Reinforced Concrete
- B. American Society for Testing and Materials (ASTM)
  - ASTM A48 Standard Specification for Gray Iron Castings
  - ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
  - ASTM A775 Standard Specification for Epoxy-Coated Steel Reinforcing Bars
  - ASTM C478 Standard Specification for Precast Reinforced Concrete Manhole Sections
  - ASTM C497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile
  - ASTM C877 Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections
  - ASTM C890 Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
  - ASTM C990 Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
  - ASTM C913 Standard Specification for Precast Concrete Water and Wastewater Structures
  - ASTM C920 Standard Specification for Elastomeric Joint Sealants

- |            |   |
|------------|---|
| ASTM C923  | Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals |
| ASTM C1107 | Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)   |
| ASTM D4101 | Standard Specification for Polypropylene Injection and Extrusion Materials  |
| ASTM F593  | Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs   |
| ASTM F594  | Standard Specification for Stainless Steel Nuts   |
- C. American Association of State Highway and Transportation Officials (AASHTO)
- |             |  |
|-------------|--|
| AASHTO M198 | Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets |
| AASHTO M306 | Standard Specification for Drainage, Sewer, Utility, and Related Castings  |
- D. Federal Specifications (FS):
- FS SS-C-153C Cement, Bituminous, Plastic.

### 1.03 SUBMITTALS

- A. Action Submittals
1. Product Data
    - a. Manhole castings
    - b. Manhole steps
    - c. Joint sealants
    - d. Connections between structure and pipe
    - e. Non-shrink grout
    - f. Grade adjusting rings
  2. Shop Drawings
    - a. Provide shop drawings of precast concrete structures and components.
  3. Maintenance Material Submittals
    - a. Tools for frame and chimney seals
    - b. Manhole cover removing tools

## **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery and Acceptance Requirements
  - 1. Ship and handle precast sections in a manner that will prevent damage as recommended by the manufacturer.
  - 2. Units shall not be shipped until they have reached at least 75% of their specified 28-day design strength.
  - 3. Contractor shall take acceptance of all deliveries.
- B. Storage and Handling Requirements
  - 1. Store precast concrete units in on relatively flat ground in a manner that will minimize potential damage.

## **PART 2 - PRODUCTS**

### **2.01 PRECAST REINFORCED CONCRETE MANHOLE COMPONENTS**

- A. Circular manhole components including base sections, risers sections, grade rings (adjusting rings), eccentric cone, flat slab top and manhole reducing bench shall meet ASTM C478.
- B. Provide precast concrete sections and related components conforming to ASTM C478, Type II with acid resistant cement.
- C. Provide base section with base riser section and integral monolithic bottom extending minimum of 6 inches beyond riser section.
- D. Provide riser sections with dimensions and orientation of pipe cut-outs as shown on the Drawings.
- E. Joint design shall be in accordance with ASTM C990.
- F. Provide lifting inserts with base and riser sections. No through wall lifting holes.
- G. Mark date of manufacture and name or trademark of manufacturer on inside of barrel.
- H. Precast Concrete Base
  - 1. Base section shall include base riser section with integral monolithic bottom extending minimum of 6 inches beyond riser section.
  - 2. Provide cast in-place concrete base where shown on the Drawings.

- a. Provide Class AA Portland cement concrete mix design in accordance with the appropriate Specification Section.
- b. Reinforcement
  - (1) Provide in accordance with ASTM A775.
  - (2) Provide bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place.
- 3. Invert
  - a. Provide precast invert integrally with the base for sanitary sewer.
  - b. Provide cast in-place concrete inverts for storm sewer.
  - c. Invert shall be same diameter of largest adjoining sewer pipe and have depth 1/2 of diameter of largest adjoining sewer pipe. Invert bench shall slope towards invert at minimum of 2 inches per foot.

I. Manhole Top

- 1. Provide eccentric cone section for manholes unless flat slab top section is shown on the Drawings.
- 2. Provide flat slab top where shown on Drawings.
- 3. Provide eccentric cone section on sanitary sewer and storm sewer unless otherwise shown on the Drawings.
- 4. Manhole and structure top shall be capable of supporting HS-25 loading.
- 5. Provide top opening of cone section or flat slab top of diameter shown on the Drawings.

**2.02 REINFORCED PRECAST CONCRETE RECTANGULAR AND SQUARE STRUCTURES**

- A. Rectangular and square structure components including base sections, riser sections, grade rings (adjusting rings), flat slab top shall meet ASTM C913.
- B. Design in accordance with ACI 318 and ASTM C890.
- C. Provide riser sections with dimensions and orientation of pipe cut-outs as shown on the Drawings.
- D. Provide lifting inserts with base and riser sections. No through wall lifting holes.

- E. Mark date of manufacture and name or trademark of manufacturer on inside of barrel.
- F. Precast Concrete Base
  - 1. Base section shall include base riser section with integral monolithic bottom extending minimum of 6 inches beyond riser section unless shown otherwise on the Drawings.
  - 2. Provide cast in-place concrete base where shown on the Drawings.
    - a. Provide Class AA Portland cement concrete mix design in accordance with the appropriate Specification Section.
    - b. Reinforcement
      - (1) Provide in accordance with ASTM A775.
      - (2) Provide bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place.
  - 3. Invert or Slopes
    - a. Provide cast in-place concrete inverts or slopes where shown on Drawings.
    - b. Invert shall be same diameter of largest adjoining sewer pipe and have depth 1/2 of diameter of largest adjoining sewer pipe. Invert bench shall slope towards invert at minimum of 2 inches per foot.
    - c. Slopes shall be at configuration as shown on Drawings.
- G. Structure Top
  - 1. Provide flat slab top as shown on Drawings.
  - 2. Manhole and structure top shall be capable of supporting HS-20 loading.
  - 3. Provide top opening of configuration and size shown on Drawings.

### **2.03 GRADE ADJUSTING RINGS**

- A. Provide grade adjusting rings with the inside dimension not less than the inside dimension of the manhole frame and not less than the inside dimension of the rectangular opening. Exterior dimensions shall not overhang the concrete sections.

- B. Grade rings shall be shaped for the application; e.g. circular for manhole castings and rectangular for rectangular castings.
- C. The grade adjusting rings shall be designed to allow final adjustment of the frame and cover or grate to the grade established on the Drawings or established by the Engineer.
- D. Grade adjusting rings shall be capable of supporting the minimum requirements of AASHTO M-306, H-25 and HS-25.
- E. Precast Concrete Grade Adjusting Rings
  - 1. Provide 2" thick precast reinforced concrete adjusting rings complying with ASTM C478.
    - a. Adjusting rings shall be free from cracks, voids, and other defects.
    - b. Provide minimum of two precast concrete rings with a maximum height of 10 inches total.
  - 2. Provide top 2 inches of adjusting rings height with rubber ring manufactured by Infra-Riser when in a traffic area.
    - a. Provide tapered rubber adjusting ring in sloped pavement.
    - b. Provide manufacturer recommended polyurethane sealant between rubber rings.

#### **2.04 JOINT SEALANTS**

- A. Provide bituminous plastic cement meeting Federal Specification SS-C-153C, Type I as sealant between riser sections and concrete adjusting rings as shown on the Drawings.
- B. Joint sealant gasket shall be 1-1/4" thick butyl rubber material meeting requirements of AASHTO M-198 Type B flexible plastic gasket and ASTM C990 butyl rubber sealant.
- C. Grade Adjusting Rings
  - 1. Provide M-1 Structural Adhesive/Sealant between expanded polypropylene grade adjusting rings meeting the requirements of ASTM C-920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A and O.
  - 2. Provide polyurethane joint sealer/adhesive for attaching rubber grade adjusting rings.
  - 3. Provide ASTM C990 butyl rubber sealant between high density polyethylene adjusting rings.

## **2.05 NON-SHRINK GROUT**

- A. Provide cementitious premixed, non-shrink, non-metallic compound, conforming to ASTM C1107.
- B. Acceptable Products and Manufacturers
  - 1. Five Star Grout manufactured by Five Star Products, Inc.
  - 2. 588-10K manufactured by W.R Meadows, Inc.
  - 3. Euco Cable Grout PTX or Euco NS Grout manufactured by Euclid Chemical Company
  - 4. SikagROUT 212 manufactured by Sika Corporation

## **2.06 PIPE TO STRUCTURE CONNECTIONS FOR WATERTIGHTNESS**

- A. Connection between riser section and Storm Sewer Pipe:
  - 1. Provide a non-shrink grout between riser section opening and storm sewer pipe.

## **2.07 MANHOLE STEPS**

- A. Steel reinforced coated with copolymer polypropylene meeting ASTM C478.
- B. Copolymer polypropylene shall meet ASTM D4101.
- C. Steel reinforcement shall be ASTM A615, Grade 60, ½” minimum steel reinforcing rod.
- D. Step shall be 10” wide center to center of anchors and project from the wall between 5” and 7”.
- E. Minimum design live load shall be a single concentrated load of 300 lbs. when in place.
- F. Uniformly space steps at 12 inches to 16 inches.
- G. Align steps with vertical side of eccentric top section.
- H. Place first step no more than 36 inches from top of casting.
- I. Do not place steps in lift station wet wells.

## **2.08 CASTINGS**

### **A. Manhole Castings**

1. Shall be ASTM A48, Class 35B, gray iron.
2. Manhole frame and covers shall be non-rocking.
3. Manhole covers for sanitary sewer shall be self-sealing with concealed pick hole.
4. Shall be of uniform quality free from blowholes, shrinkage, discoloration, and other defects.
5. Shall be heavy duty designed for HS-20 loadings.
6. Provide frame and covers of type shown on Drawings.
7. Stamp the word “SANITARY” on all sanitary sewer manhole castings.
8. Stamp the word “STORM” on all storm sewer manhole castings.
9. Provide size and configuration as shown on Drawings.

### **B. Inlet and Catch Basin Castings**

1. Shall be ASTM A48, Class 35B, gray iron.
2. Shall be of uniform quality free from blowholes, shrinkage, discoloration, and other defects.
3. Shall be heavy duty designed for HS-20 loadings.
4. Provide frame, box and grate of type shown on Drawings.
5. Stamp the words “Dump No Waste – Drains to Fresh Water” on castings.
6. Provide size and configuration as shown on Drawings.

## **2.09 MANHOLE COVER REMOVING HOOK**

- A. Provide 24-inch long forged 5/8 inches hexagonal steel manhole cover hook.
- B. For use in removing concealed pick hole manhole cover.
- C. Handle shall be 90 degrees type.
- D. Provide hook with flat taper.



- E. 300 lbs. capacity.
- F. Provide one manhole cover hook for each 20 manhole covers required for Project or fraction thereof.

## **2.10 GRANULAR FOUNDATION**

- A. Structure bedding material below the concrete structure base shall be ¾-inch crushed rock chips gradation, Soil Class A-7, in accordance with appropriate Specification.

## **PART 3 - EXECUTION**

### **3.01 GENERAL ALL STRUCTURES**

- A. Depths shown on Drawings shall be considered approximate.
- B. Excavate for installation of the structure in accordance with the appropriate Specification Section.
- C. Install sheathing as required to protect the excavation and existing facilities and pavement around the structure.
- D. Install dewatering necessary to lower the water level to at least one foot below the bottom of the excavation.
- E. Concrete base bedding
  - 1. Place bases on a minimum of 6 inches of Soil Class A-7 bedding material:
  - 2. Place and work by hand to insure excavated voids are filled.
- F. Install precast concrete structures plumb and to line and grade shown on the Drawings to within a tolerance of 1/8-inch in 4 feet.
- G. Unless indicated otherwise, provide precast concrete construction for all structures shown on the Drawings.
- H. Provide precast risers in a combination of lengths to minimize the number of joints.
- I. Provide joint sealant between precast concrete structure components to compress sealant with subsequent precast concrete riser section.
- J. Fill interior holes with mortar and finish smooth.

### **3.02 PRECAST REINFORCED CONCRETE MANHOLES, CATCH BASINS AND INLETS**

#### **A. Structure Installation**

1. Establish flow lines and casting elevations from grade stakes and cut sheets.
2. Provide 6 feet minimum height from top of casting to flowline, unless otherwise shown on the Drawings.
3. Fill annular space around pipes with non-shrink grout finished smooth, interior bottom half pipe opening only.
4. Provide manhole, catch basins and inlets of size shown on the Drawings. Four foot diameter shall be considered standard for manholes.
5. Pitch casting to match street cross-slopes.
6. Use precast concrete flat top in lieu of a cone section when elevation is limited.

#### **B. Pipe Connections.**

1. For pipe other than storm sewer, the pipe shall enter the barrel through a flexible, watertight gasket or connector.
2. For storm sewer pipe, place non-shrink grout between pipe and precast concrete wall section inside and outside the storm structure providing a soil-tight seal.
3. Pipe penetrations shall not be through cone section.

#### **C. Cast manhole steps in place on each manhole unless otherwise shown on the Drawings.**

#### **D. Provide frame and cover castings on structure as shown on the Drawings.**

#### **E. Manhole Drops:**

1. Conform to the detail Drawings.
2. Furnish where designated on Drawings.

#### **F. Structure Base Concrete Inverts:**

1. Shape to the lower half diameter of the largest connecting pipe.
2. Slope concrete bench upward to manhole wall.

3. Maintain a uniform flow line slope through manhole which matches minimum pipe slope.
  4. Provide precast concrete manholes with a manufacturer installed invert.
- G. Provisions for Future Sewer Connections:
1. Provide pipe stubs as shown on the Drawings.
  2. Extend pipe stubs a maximum of 12 inches from outer wall of structure unless otherwise shown on Drawings.
  3. Cap or bulkhead pipe stub to watertight condition.
- H. Grade Adjusting Rings
1. Provide grade adjusting rings with a maximum height of 10 inches.
  2. Provide a minimum of 2 rings for grade adjustment.
  3. Provide grade adjusting rings such that the final casting grade is set to 1/4 inch below final paved surface, within 1/8 inch tolerance plus/minus.
  4. Precast Concrete Grade Adjusting Rings
    - a. Provide concrete grade adjusting rings with the top 2 inches of rubber ring, tapered as necessary to match surface grade with casting.
    - b. Provide 1/4 inch thick bituminous plastic cement between concrete grade rings; and between the precast concrete section and the concrete grade rings providing a watertight seal.
    - c. Attach the rubber grade adjusting ring to concrete grade ring using polyurethane joint sealer/adhesive creating watertight seal.
    - d. Wrap the grade rings to the precast concrete section with manhole joint wrap of minimum width of 16 inches in accordance with the wrap manufacturer's recommendations providing a water tight seal.

**END OF SECTION**

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**SECTION 33 05 97.26**  
**UNDERGROUND TRACE WIRE MARKING FOR UTILITIES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Trace Wire
  - 2. Trace Wire Connectors
  - 3. Trace Wire Terminal Boxes

**1.02 SUBMITTALS**

- A. Action Submittals
  - 1. Product Data
    - a. Provide product data for trace wire, connectors and terminal boxes.

**PART 2 - PRODUCTS**

**2.01 TRACE WIRE**

- A. Open Trench – Provide #12 AWG copper clad steel, high strength with minimum 450 lb. break load, with minimum 30 mil HDPE or high molecular weight polyethylene insulation thickness designed for direct bury.
- B. Directional Drilling/Boring – Provide #12 AWG copper clad steel, extreme strength with 1,150 lb. break load, with minimum 30 mil HDPE or high molecular weight polyethylene insulation thickness designed for direct bury.
- C. Pipe Bursting/Slip Lining – Provide 7x7 stranded copper clad steel, extreme strength with 4,700 lb. break load, with minimum 50 mil HDPE or high molecular weight polyethylene insulation thickness designed for direct bury.
- D. Insulation Color
  - 1. Non-metallic potable water main and water services – blue color.
  - 2. Non-metallic non-potable water main – purple color.
  - 3. Non-metallic sanitary sewer and sanitary sewer services – green color.
  - 4. Non-metallic storm sewer and storm sewer services – black color.

## **2.02 TRACE WIRE CONNECTORS**

- A. Direct Bury
  - 1. Provide main line splice to service line connection specifically manufactured for use in underground trace wire installation, dielectric silicon filled to seal out moisture and corrosion, and installed in a manner to prevent any uninsulated wire exposure.
  - 2. Interconnect mainline trace wires at intersections with tees and crosses.
    - a. At tee intersections, join the three wires using a single 3-way lockable connector.
    - b. At cross intersections, join the four wires using a 4-way connector. Using two 3-way connectors with a short jumper wire between the connectors is an acceptable alternative.
- B. Directional Drilling and Pipe Bursting
  - 1. Do not splice wire for directional drilling and pipe bursting on the main line.
  - 2. Intersection splicing shall follow direct bury connector requirements.

## **2.03 TRACE WIRE TERMINATION/ACCESS**

- A. Provide trace wire grade level/in-ground access box or above ground access post at trace wire termination points.
- B. Provide manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
- C. Connect grounding anode wire to bottom terminal on the access boxes/posts.
- D. Grade Level / In-Ground Access Boxes
  - 1. Provide grade level/in-ground access boxes identified with “sewer” or “water” as appropriate cast into the cap and be color-coded blue for water, green for sanitary sewer and black for storm sewer.
  - 2. Provide access box with minimum of 2 ½ inches diameter and 12 inches of depth.
  - 3. Provide cast iron locking cap/cover on the access box.

4. Acceptable Manufacturers
  - a. Test & Valve Products, Inc. Tracer Wire Access Box
  - b. Bingham & Taylor Cathodic Protection Test Boxes
  - c. Copperhead Snakepit Test Stations
- E. Above Ground Access Posts
  1. Provide above ground access post covers boxes identified with “sewer” or “water” as appropriate and be color-coded blue for water, green for sanitary sewer and black for storm sewer.
  2. Provide post of polypropylene material extending 60 inches above ground.
  3. Acceptable Manufacturers
    - a. Copperhead Cobra T3 Test Stations
    - b. Rhino Marking & Protection Systems TriView Flex

## **2.04 GROUNDING**

- A. Ground trace wire at all dead ends/stubs.
- B. Provide a drive-in magnesium grounding anode rod with a minimum of 20 feet of #12 red HDPE insulated copper clad steel wire connected to anode (minimum 0.5 lbs.) specifically manufactured for this purpose and buried at the same elevation as the utility.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Install trace wire on non-metallic pipe with trace wire access not more than 400-foot intervals.
- B. Perform trace wire installation in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- C. Provide trace wire system as a continuous single wire without looping or coiling of wire.
- D. Immediately repair any damage occurring during installation of the trace wire in an approved waterproof method. Do not tape and/or spray coat.

- E. Terminate trace wire on all service laterals/stubs a trace wire access box directly above the utility, using color-coded access boxes, located at the edge of the road right of-way, but out of the roadway.
- F. All mainline dead-ends shall go to ground using an approved waterproof connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire.
  - 1. Bury the anode on the opposite side of the utility at the furthest most point.
  - 2. Connect the anode wire in the trace wire access box to the trace wire utilizing the connection point in the access box.
- G. Do not connect mainline trace wire to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode, buried at the same depth as the trace wire.
- H. Connect all service lateral trace wires to the mainline with a single wire, (no looping) using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
- I. In occurrences where existing trace wire is encountered on an existing utility that is being extended or tied into, connect the new and existing trace wire using approved splice connectors, properly ground at the splice location as specified and be completely waterproof to prohibit corrosion and loss of conductivity.
- J. Installation - Sanitary Sewer System
  - 1. Provide mainline trace wire with all service lateral trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.
  - 2. Lay mainline trace wire continuously, bypassing around the outside of manholes/structure on the North or East side.
  - 3. Provide trace wire at the 3 o'clock position of the pipe, taping or tying at 10-foot intervals.
  - 4. Terminate trace wire on all sanitary laterals at an approved trace wire access box color coded green and located directly above the service lateral at the road right of way. Follow grounding specifications and connections.
- K. Installation - Water System
  - 1. Provide mainline trace wire with all service lateral and hydrant lead trace wires properly connected to the mainline trace wire, to ensure full tracing/locating capabilities from a single connection point.



2. Lay mainline trace wire continuously, bypassing around the outside of valves and fittings on the North or East side.
3. Provide trace wire at the 3 o'clock position of the pipe, taping or tying at 10-foot intervals.
4. Terminate trace wire on all water service laterals and hydrant leads at an approved trace wire access box color coded blue and located directly above the service lateral at the road right of way. Follow grounding specification and connections.
5. Provide tracer wire access boxes on all fire hydrants securely connected to the fire hydrant. Do not use straps or tape.
6. Provide tracer wire for all conductive and non-conductive service lines secured to pipe by taping or tying at 5 foot intervals.

L. Installation - Storm Sewer System

1. If the storm sewer system includes service laterals for connection of private drains and tile lines, provide trace wire the same as a sanitary sewer application.
2. Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.
3. Provide trace wire at the 3 o'clock position of the pipe, taping or tying at 10-foot intervals.
4. Terminate trace wire on all storm sewer laterals at an approved trace wire access box color coded black and located directly above the service lateral at the road right of way. Follow grounding specification and connections

M. Prohibited Methods and Materials

1. Uninsulated trace wire
2. Twist-on wire connectors
3. Brass or copper ground rods
4. Wire connections utilizing taping or spray-on waterproofing
5. Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
6. Brass fittings with trace wire connection lugs

7. Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
8. Connecting trace wire to existing conductive utilities. To prevent corrosion at existing grounding options on corps or curb stops or splices. Anode grounding will prevent the wire from corroding.

### **3.02 FIELD QUALITY CONTROL**

#### **A. Field Tests and Inspections**

1. Locate all new trace wire installations using typical low frequency (512Hz) line tracing equipment, witnessed by the Contractor, Engineer and Owner.
2. Perform this verification upon completion of rough grading and again prior to Substantial Completion.
3. Continuity testing in lieu of actual line tracing is not acceptable.

#### **B. Non-Conforming Work**

1. Correct any areas where trace wire installations cannot be traced with line tracing equipment.

**END OF SECTION**

**SECTION 33 14 00**  
**WATER UTILITY TRANSMISSION AND DISTRIBUTION**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
1. Water Utility Transmission and Distribution Piping Installation
  2. Water Utility Transmission and Distribution Fittings Installation
  3. Water Utility Transmission and Distribution Pipeline Accessories
  4. Water Utility Service Valves
  5. Water Utility Service Hydrants
  6. Insulation Board for Frost Shield
  7. Disinfection

**1.02 REFERENCES**

- A. American Water Works Association (AWWA)
- |           |  |
|-----------|--|
| AWWA C105 | Polyethylene Encasement of Ductile-Iron Pipe Systems   |
| AWWA C116 | Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service |
| AWWA C219 | Bolted, Sleeve-Type Couplings for Plain-End Pipe   |
| AWWA C502 | Dry-Barrel Fire Hydrants   |
| AWWA C504 | Rubber-Seated Butterfly Valves   |
| AWWA C509 | Resilient-Seated Gate Valves for Water Supply Service  |
| AWWA C512 | Air-Release, Air/Vacuum and Combination Air Valves for Waterworks Service  |
| AWWA C515 | Reduced Wall, Resilient Seated Gate Valves for Water Supply Services   |
| AWWA C550 | Protective Epoxy Interior Coatings for Valves and Hydrants   |
| AWWA C600 | Installation of Ductile-Iron Water Mains and Their Appurtenances   |
| AWWA C605 | Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water  |
| AWWA C800 | Underground Service Line Valves and Fittings   |

- B. American Society for Testing and Materials (ASTM)
- |            |   |
|------------|---|
| ASTM A307  | Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength |
| ASTM C578  | Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation                         |
| ASTM D2774 | Standard Practice for Underground Installation of Thermoplastic Pressure Piping                   |
| ASTM D3139 | Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.    |
| ASTM F1668 | Standard Guide for Construction Procedures for Buried Plastic Pipe                                |
| ASTM F1674 | Standard Test Method for Joint Restraint Products for Use with PVC Pipe                           |

### 1.03 SUBMITTALS

- A. Action Submittals
1. Product Data
    - a. Provide manufacturer's product data and installation instructions for valves, hydrants, water service valves, valve boxes, and joint restraints.
    - b. Restrained fittings and required length of restrained joint pipe.
  2. Shop Drawings
    - a. Provide shop drawings of layout and installation details for control valves in manholes.
    - b. Manufacturer's calculations and recommendations for joint restraint.
- B. Informational Submittals
1. Closeout Submittals
    - a. Record Documentation
      - (1) Provide record drawings for tees, bends, crosses, and plugs showing distance to adjacent valve.
      - (2) Pipe location records.

## **PART 2 - PRODUCTS**

### **2.01 WATER UTILITY TRANSMISSION AND DISTRIBUTION PIPING**

- A. Do not use more than one material brand of pipe and manufacturer.
- B. Provide pipe and joints as shown on the Drawings and stated in the Bid Form.
- C. Provide pipe in accordance with the appropriate Specification Section.

### **2.02 COUPLINGS AND ADAPTERS**

- A. Flanged Coupling Adapters
  - 1. Used for connecting plain end pipe to flanged equipment and fittings.
  - 2. Body and end rings (follower rings): Ductile iron complying to ASTM A536.
  - 3. Body and end rings coating: epoxy coated.
  - 4. Gaskets: New rubber compounded for water service and resistant to permanent set. Full face flange gasket.
  - 5. Provide with anchor studs.
  - 6. Bolts and Nuts: High strength, low alloy corrosion resistant steel or carbon steel bolts complying with ASTM A307.
- B. Tapping Sleeves
  - 1. Rated at 200 psi working pressure up to 12" diameter and 150 psi working pressure above 12" diameter.
  - 2. Outlet Joint: Flanged joint allowing use of tapping MJxFL valve.
  - 3. Sleeve and outlet flange: 304 stainless steel.
  - 4. Gasket: Full-length waffle style 360 degrees around the pipe.
- C. Acceptable coupling and adapter Manufacturers: Dresser, Smith-Blair, or Ford-FAST.

### **2.03 WATER UTILITY TRANSMISSION AND DISTRIBUTION PIPELINE ACCESSORIES**

- A. Trust Restraints

1. Mechanical Restraints
  - a. Ductile Iron Pipe and Fittings:
    - (1) Megalug Series 1100 follower gland or equal for mechanical joint restraints.
    - (2) Clow “Super Lock,” American “Lok-Ring” or U.S. Pipe “TR Flex/HDSS/HP LOK” for push-on joint restraint.
  - b. Polyvinyl Chloride (PVC) Pipe:
    - (1) Megalug Series 2000 PV restraint gland or equal for mechanical joint restraint.
    - (2) EBAA Iron, Inc. Series 1600 for AWWA C-900 pipe push-on joint restraint and EBAA Iron, Inc. Series 2800 for AWWA C-905 pipe push-on joint restraint, or equal.
2. Concrete Thrust Blocks *(Note: If joints are restrained, then Concrete Thrust Blocks are not needed.)*
  - a. Ready-mixed concrete conforming to the following:
    - (1) Class 28-day Comp. Str. (PSI): 3,000
    - (2) Max. Size Coarse Aggregate: 1-1/2 inch
    - (3) Min. Cement Content (Bags/C.Y.): 4.75
    - (4) Air Content (%): 6
    - (5) Slump: 3 inch - 4 inch
    - (6) Job-mixed concrete is permitted for amounts one cubic yard or less and shall meet the same material and strength requirements as ready-mixed concrete.
3. Tie Rods
  - a. Rods and straps shall meet ASTM A-575, Grade M 1020.
  - b. Rods shall be minimum 3/4” diameter to 16” pipe diameter.
  - c. Clamps, nuts, washers, and other components shall be of corrosion-resistant material.

B. Polyethylene Encasement for Ductile Iron Pipe and Fittings

1. Conform to requirements of AWWA C105.
2. Type: I
3. Class: "A" (natural color) or "C" (black).
4. Grade: "E-1"

C. Tracer Wire

1. Provide in accordance to the appropriate Specification Section.

**2.04 WATER UTILITY SERVICE VALVES**

A. General

1. Valves shall be for buried service.
2. Provide mechanical joint valve end connections unless in a manhole structure, then provide flanged joint.
3. Mechanical joints to conform with AWWA C111 and as follows:
  - a. Ductile or gray iron follower gland.
  - b. Shall be 304 stainless steel.
  - c. Gaskets
    - (1) Plain rubber gasket for sewer and water to temperatures not exceeding 150°F.
    - (2) Buna-N Nitrile (NBR) in petroleum contaminated soils.
  - d. Operating stem shall turn counterclockwise to open.
  - e. Seal shaft or stem using O-ring seals.
4. Flanged Joints
  - a. Flange joints shall not be buried underground.
  - b. Conform with AWWA C115.
  - c. Joints shall include:
    - (1) Ductile iron flanges.

- (2) Bolts with nuts.
  - (3) Gaskets
  - (4) Sheet rubber gaskets, full face, minimum 1/8 inch thick for sewer and water to temperatures not exceeding 150°F.
- d. Use above grade, in manholes, in structures and other areas where the joint is exposed.

B. Gate Valves

- 1. Conform to requirements of AWWA C509 or AWWA C515 mechanical joint connectors.
- 2. Use where water main is 12 inches diameter or smaller
- 3. Stem shall be non-rising.
- 4. Tapping valves shall have one end flanged with alignment lip to attach tapping sleeve, and the other end with a special flange to attach the drilling machine and adaptor.
- 5. Acceptable Manufacturers: Mueller, Clow, M&H, Kennedy R/W, Waterous or AFC (American Flow Control).

C. Valve Wrenches/Key

- 1. T-handle valve wrench/key 1 1/4 inch Schedule 40 steel pipe.
- 2. Dropped forged socket to fit 2 inch square nut with openings at the top to allow debris to exit.
- 3. Length shall be such to allow operation with T-handle minimum of 3 feet above valve box cover.
- 4. Provide two (2) wrench keys per contract or one (1) per 20 valves, whichever is greater.

D. Valve Boxes

- 1. For buried service.
- 2. Cast iron, three-piece screw type, 5 1/4 inch shaft, round or oval base sized for valve.
- 3. Threads shall be cast into top and bottom sections.
- 4. Cover shall be anti-rattle type mark with the word "water" on top.



5. Valve boxes shall be made in USA.
6. Acceptable Manufacturers: Tyler, Bingham and Taylor, Bibby St. Croix.

## **2.05 WATER UTILITY SERVICE HYDRANTS**

- A. Acceptable Hydrant Manufacturer: Waterous Pacer.
- B. Conform to requirements of AWWA C502.
- C. Compression type shutoff with bronze by bronze seating design opening against the pressure and closing with the pressure.
- D. Main Valve Opening: 5¼”
- E. Minimum Barrel Diameter: 7”
- F. Provide traffic model with upper and lower barrels joined at the ground line by a separate, breakable, and replaceable flange joint and providing 360 degrees rotation of upper barrel.
- G. Design hydrant to accept barrel extensions.
- H. Nozzles
  1. Provide three-way design with one 4 ½” NST pumper nozzle and two 2½” NST hose nozzles.
  2. Provide nozzle caps with nut the same size as the operating nut and chain.
- I. Bury depth shall be 7 feet measured to the nearest ½ foot from the bottom of the connecting pipe to the ground line of the hydrant.
- J. Inlet connection shall be 6 inch mechanical joint conforming with AWWA C111 and as follows:
  1. Ductile or gray iron follower gland.
  2. 304 stainless steel.
  3. Gaskets
  4. Plain rubber gasket for sewer and water to temperatures not exceeding 150°F.
  5. Buna-N Nitrile (NBR) in petroleum contaminated soils.
- K. Hydrant to have 16” break-off section.

- L. 1½” pentagon operating nut to open left.
- M. Hydrant Wrench
  - 1. Galvanized wrench and spanner with unbreakable drop forged steel head.
  - 2. Adjustable to fit pentagon nuts and caps up to 1¾”, squares up to 1¼”.
  - 3. Fits pin or rocker lug hose couplings with double spanner.
  - 4. Provide two (2) wrenches per contract or one (1) per ten (10) hydrants whichever is greater.

## **2.06 HYDROSTATIC PRESSURE AND LEAKAGE TESTS EQUIPMENT**

- A. Provide the pump, pipe connections, and all necessary apparatus for the pressure and leakage tests including gauges and metering devices.
- B. Pressure gauges used for testing shall have no greater than 5 psi increment markings.

## **2.07 INSULATION BOARD**

- A. Extruded polystyrene conforming to ASTM C578, Type IV.
  - 1. Compressive strength of at least 40 PSI.
  - 2. Minimum R-value of 5.
  - 3. Maximum water absorption of 0.17% by volume
- B. Each board shall be 2 inches thick x 4 feet wide x 8 feet long.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Protection of In-Place Conditions
  - 1. Protection of Work, Public, and Property
    - a. Provide safe passage for local vehicular and pedestrian traffic.
    - b. Provide vehicular and pedestrian access to properties abutting street where utilities are being constructed.
    - c. Provide all necessary barricades, warning lights, and signs, signals, flagmen, etc. in accordance with federal, state, and local regulations.

- d. Provide and maintain safety equipment for confined entry at the project site at all times for use by the Contractor's personnel and Owner's Representative.
- e. Organize and perform construction activities to minimize the creation of airborne dust and the tracking of mud and dirt into public streets.
- f. If dust is generated, implement control measures such as:
  - (1) Street sweeping and cleaning.
  - (2) Water sprinkling or application of chemical dust suppressant.
  - (3) Cover dusty materials in piles or in transit.
  - (4) Protect buildings that may be adversely affected.
  - (5) Protect new and existing machinery, motors, instrument panels or similar equipment with suitable dust screens.
    - i) Provide proper ventilation with dust screens.

2. Protection of Utilities and Structures

- a. The existing utilities and structures are shown on the Drawings may not be all inclusive.
- b. The locations of existing utilities and structures are shown on the Drawings for information to the Contractor, but should not be construed as representative of the exact location.
- c. Maintain or provide:
  - (1) Service of water, sewers, gas, culverts, drains, electricity, or other utilities encountered.
  - (2) Temporary connections and outlets for all private and public utilities that are interrupting construction.
  - (3) Disposal for all drainage and sewage resulting from relocations and/or interruptions in accordance with regulations and permits of the controlling governmental agency(s).
  - (4) Correct any damage to below or above ground utilities and structures encountered during construction.

- d. Separation of Water Mains and Sewers
  - (1) Provide minimum separations between sewers and water mains:
    - i) Parallel - 8 feet, measured center to center.
    - ii) Vertical (when pipelines cross or when horizontal clearance is impossible)
      - a) Water Main Below a Sewer: 18 inches clear. (Both pipes shall be constructed of water main quality pipe and joints for ten feet either side of the crossing)
      - b) Water Main Above a Sewer: 6 inches clear.
  - (2) When crossing a sewer, center a full length of water main or sewer to position joints as far as possible from sewer.

3. Protection of Established Property Markers

- a. Protect all property markers (iron pipe, concrete, or wood posts, etc.) from movement from original position.
- b. Pay costs of replacement of property markers moved during construction.

B. Demolition / Removal

- 1. Provide demolition and/or removal of paved surfaces.
  - a. Minimize the removal area and protect paved surfaces outside trench area.
  - b. Provide in accordance to appropriate Specification Section.

**3.02 WATER UTILITY PIPING INSTALLATION**

A. General

- 1. Vertical and Horizontal Alignment:
  - a. Install pipe to maintain vertical and horizontal alignment as shown on the Drawings.
  - b. Place pipe to required line and grade with a tolerance of plus or minus 0.1 feet.

- c. Install pipe without unplanned high points in the line, and a minimum cover over the top of pipe of 6.5 feet.
- d. Provide fittings, valves and hydrants at the required locations with joints centered, spigots bottomed and valve and hydrant stems plumb.
- e. Commence pipe installation only after the trench has been dewatered below the trench bottom and all necessary sheeting and bracing is in place.
- f. Use full length pipe except where necessary at valves and fittings.
- g. Cut pipe to provide a smooth end at a right angle to the longitudinal axis of the pipe.
- h. Assemble pipe in accordance with the written recommendations of the manufacturer.
- i. When the interruption or operation of an existing pressure pipeline system is necessary to complete construction, conform to the following:
  - (1) Owner will operate system at Contractor's request.
  - (2) Confine requests to Owner's normal working schedule.
  - (3) Do not operate controls or appurtenances.

**B. Open Cut Installation Method**

- 1. Pipe construction of any pipe material shall follow the recommended procedures of ASTM F1668.
- 2. Trench requirements shall conform to the appropriate Specification Section.
- 3. Keep pipe clean during and after laying.
- 4. Do not roll, drop or dump pipe appurtenances into the trench.
- 5. When laying operations are interrupted or terminated, temporarily seal pipe ends to prevent entry of water, debris, small animals, or other types of contamination. Prevent flotation of the sealed pipe.

C. Trenchless Excavation Method

1. Boring and Jacking:

- a. Provide casing pipe bored and jacked in-place in accordance to the appropriate Specification Section, at line and grade to accommodate the carrier pipe.

2. Horizontal Directional Drilling:

- a. Install pipe directly by horizontal directional drilling in accordance to the appropriate Specification Section at the line and grade shown on the Drawings.
- b. Design pipe as required above that specified to accommodate tensile stress during the installation process.

D. Polyvinyl Chloride (PVC) Pipe Installation

1. Install pipe and appurtenances in accordance with AWWA C605.
2. Do not bend pipe.

E. Pipe Embedment

1. Plastic Pipe - Class "B" Embedment:

a. Bedding, Haunching and Initial Backfill:

- (1) 4" below pipe to 12" above the pipe, place Soil Class A-7 material work by hand to ensure all excavated voids are filled.
- (2) If in rock, place Soil Class A-7 material 6" below pipe to 12" above the pipe and work by hand to ensure all excavated voids are filled.
- (3) Block pipe installed through steel casing so as not to touch steel casing and fill the annular space between steel casing and carrier pipe.

F. Thrust Restraints

1. Provide at mechanical joint and push-on joint connections including valves, hydrants, and fittings including plugs, caps, tees, reducers and bends.
2. Provide thrust restraint with mechanical restraints or tie rods which physically prevent joint separation; or poured in place concrete thrust

blocks constructed to transfer the thrust load from the pipe to the undisturbed soil of the trench wall.

3. When using mechanical restraints or tie rods, restrain the fitting joints within the following minimum pipe length on each side of the fitting unless manufacturer's submitted calculations and recommendations indicate otherwise:

RESTRAINED/TIED PIPE LENGTH CHART								
Minimum Length Requiring Restraint in Feet (Bare Pipe)								
Fitting Type	6"	8"	10"	12"	16"	20"	24"	30"
11.25 degree bend	10	10	10	10	20	20	20	20
22.5 degree bend	10	10	10	15	20	20	35	40
45 degree bend	15	20	25	30	40	45	50	65
90 degree bend	20	20	25	40	60	80	80	120
Tee (side tied)	15	20	30	35	50	65	80	110
Stubs or dead ends	25	35	45	50	65	80	95	120
Cross with plugged	15	20	30	35	50	65	80	110
Valves at end of line	25	35	45	50	65	80	95	120
The above lengths (given in feet) represent the minimum length of pipe to be tied together in each required direction from the fitting described.								

- G. Where grade changes are made in the line by means of bends, secure the top bends by tie rods and secure the bottom bends by means of poured in-place concrete thrust blocks or provide mechanical restraints within a pipe length of 30' of the joint.
  1. Install mechanical restraints in accordance with the manufacturer's recommendations. Use a torque limiting twist off nut without the need for a torque wrench to insure proper actuation of the restraint wedge.
  2. Restrain hydrants with mechanical restraints or with tie rods connecting all joints between the hydrant and the main line.
- H. Connections to Existing Water Main
  1. Verify material composition of existing main or lateral, as applicable.
  2. Provide adaptors and sleeves necessary to make connection to main or lateral.
  3. Provide a leak-free connection.

4. Wet Taps to Existing Water Main
  - a. Schedule tap with Owner and Engineer a minimum of two (2) working days in advance.
  - b. Use approved tapping machine designed specifically for tapping under pressure.
  - c. Disinfect sleeves, valve, and tapping machine with chlorine solution prior to assembly.
  - d. Install tapping sleeve and valve in accordance with manufacturer's instructions.
    - (1) Maintain separation from ends of sleeve to adjacent joints or fittings.
    - (2) Install a solid concrete block beneath valve for support.
  - e. Perform a leakage test on the installed tapping sleeve and valve and provide for inspection by the Engineer and Owner. No leakage will be allowed.
  - f. When tapping sleeve or tapping valve leaks, remove, reinstall, and replace, if necessary, tapping sleeve and tapping valve. Retest reinstalled or replaced sleeves and valves until they achieve satisfactory test results.

I. Maintain Water Service

1. Maintain water service to the greatest extent reasonably possible using temporary water systems, appropriate staging of construction operations, and other Owner and Engineer approved methods.
2. Coordinate water shut-offs with the Owner providing a minimum of 24 hours' notice to residents prior to shutting off their water.
3. Unless pre-approved by the Owner and Engineer, the maximum allowable duration of water service interruption to water utility customers shall be 4 hours. Customers to whom water service is critical (as determined by Owner), shall have service interruption limitations and accommodation needs determined on a case by case basis.

**3.03 WATER UTILITY DISTRIBUTION VALVES INSTALLATION**

- A. Install in accordance with AWWA C600.
- B. Provide gate valves for sizes up to and including 12 inches.



- C. Support valves on 6 inches of soil class A-7 crushed rock pipe bedding material.
- D. Provide a valve box centered plumb over the operating nut of the valve and placed such that the box will not transmit shock or stress to the valve. Adjust the top of the valve box flush with finished grade.

### **3.04 WATER UTILITY DISTRIBUTION HYDRANT INSTALLATION**

- A. Install where shown on the Drawings in accordance with AWWA C600.
- B. Install hydrants plumb with the nozzles parallel with or at right angles to the road as determined by the Owner.
- C. Set to grade with the breakaway flange not less than 2 inches nor more than 6 inches above established grade.
- D. Provide a drainage pit at the base of the hydrant placing soil class A-7 crushed rock pipe bedding material from 3 feet below the hydrant to a minimum of 6 inches above the drain - port opening in the hydrant and at least 1 foot around the elbow.
- E. If groundwater is above the drain port or the drain port is within 8 feet of a sanitary sewer or storm inlet, then plug the port. Install tag on hydrant which reads "Pump After Each Use". *(Note: Notify Owner in writing of port plugged hydrant.)*

### **3.05 INSULATION BOARD FOR PIPE FROST SHIELD**

- A. Provide where shown on the Drawings.
- B. Install insulation board in an inverted U around the pipe.
  - 1. The top width of the insulation board frost shield shall be the same as the trench width centered over the pipe.
  - 2. The sides of the U shall be 2' high with the bottom of the legs at least to the springline of the pipe.
- C. Install the insulation board in layers to provide a minimum thickness of 4" or the thickness stated on the Drawings.
- D. Install such that there are no voids under the insulation.

### **3.06 TRACER WIRE**

- A. Provide for all non-metallic sewer mains and for all non-metallic service laterals within public right-of-way.
- B. Provide in accordance to appropriate Specification Section.

- C. Provide tracer wire continuity testing in accordance to appropriate Specification Section.

### **3.07 FIELD QUALITY CONTROL**

- A. Demonstrate that all valves, hydrants, curb stops operate fully open and closed.
- B. Demonstrate that all valves are in open position.
- C. Provide Hydrostatic Pressure and Leakage Tests
  - 1. Provide hydrostatic pressure leakage tests in accordance to AWWA C600 as soon as possible after the pipe or section of pipe has been installed, concrete thrust blocking cured (min. 5 days), and the trench is completely backfilled.
  - 2. Provide hydrostatic pressure test at a pressure that is 1.5 times the normal operating pressure, but no more than the design pressure rating of the pipe and appurtenances.
  - 3. The test pressure shall not exceed the rated working pressure or differential pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.
  - 4. Provide a tapping sleeve and valve assembly to the main and pressure test the assembly prior to making the tap.
    - a. The required test pressure shall be determined in the same manner as for the pipe.
    - b. The test is acceptable if there is no pressure drop in 165 minutes at test pressure.
  - 5. Slowly fill each segregated section of pipeline with water ensuring that all air is expelled.
    - a. The line shall stand full of water for at least twenty-four hours prior to testing to allow air to escape.
    - b. If necessary, tap the main at points of highest elevation to expel air as the pipe is filled.
    - c. Remove the corporation stops and plug the taps after successfully filling the pipeline and expelling all air.
  - 6. Apply the specified test pressure, measured at the point of lowest elevation, using a suitable pump connected to the pipe.

- a. If the elevation of the high point of the pipeline being tested is such that the pressure during the testing will be below 85% of the required test pressure, then a separate test shall be performed on this section of pipeline.
  - b. In lieu of a separate test, the test pressure measured at the lowest elevation may be increased, within the pressure rating of the pipeline material, such that the resulting pressure at the highest point exceeds 85% of the required test pressure.
  - c. Conduct the test for at least two (2) hours at the required test pressure.
7. Conduct a leakage test concurrently with the pressure test.
- a. Leakage is the volume of water that is required to be supplied into the newly installed pipeline to maintain pressure within  $\pm 5$  psi of the test pressure after it is filled and purged of air.
  - b. Measure the volume of water using a calibrated container or meter.
  - c. Leakage shall not be greater than calculated by following equation:

$$L = \frac{SD\sqrt{P}}{148,000}$$

- (1) Where L = allowable leakage, in gallons per hour; S = length of pipeline tested, in feet; D = nominal diameter of pipe, in inches, and P = average test pressure during pressure test in psi.
- d. If any leakage test discloses leakage greater than allowed by the above formula, then locate and repair defective material and perform pressure and leakage test until leakage is within specified allowance.
- e. Any visible leaks shall be repaired regardless of amount of leakage.
- f. Pressure Testing Against Existing Valves:
  - (1) If the pressure test fails when pressure testing against an existing valve, investigate all possible sources of leaking.
  - (2) After investigating all other possible sources of leaking and leakage testing still fails, the Engineer will make a determination whether or not the existing valve should be replaced.

- (3) If Engineer determines the valve should be replaced, Contractor shall replace valve.
  - i) After the replacement of the valve, complete a pressure leakage test.
  - ii) If the pressure leakage test fails with the new valve installed, the Contractor shall further investigate the possible source of leaking and correct the leak.
  - iii) No compensation shall be made to the Contractor for removal and replacement of existing valve and box if the existing valve was not the cause of the leak.
  - iv) If the pressure leakage test passes due to the replacement of the existing valve, the Contractor shall be compensated for removal of the existing valve and installation of the new valve and box in accordance with the applicable contract bid item(s); or by change order if no bid items are provided.

### **3.08 DISINFECTION OF WATER MAINS**

- A. Method: Use Calcium Hypochlorite Tablet Method in accordance with requirements of AWWA C651.
- B. One pound of commercial (70%) Calcium Hypochlorite to 1,680 gallons of water may be used in lieu of tablets.
- C. Section being tested shall be isolated from remainder of system.
- D. Flushing
  1. Disposing of chlorinated water flushed from mains shall flow into sanitary sewers. Discharge to trout streams, or lakes will not be allowed unless water is dechlorinated prior to discharge and discharge is approved by WDNR.
  2. Discharge into Owner's sanitary sewer system after dechlorination must have Owner's approval.
- E. Testing
  1. Two samples are required to test for presence coliform bacteria for every 1,200 feet of new water main, at end of lines, and at each branch.

2. Take one sample and test for coliform bacteria prior to the pressure and leakage test and take one sample and test for coliform bacteria after pressure and leakage test before services are activated.
3. Provide sampling tap and collect samples.
4. Provide coliform bacteria analysis testing.
5. Provide results of tests to Engineer prior to making service connections.

### **3.09 CLEANING**

#### **A. Pipelines**

1. Interiors of utility pipelines (including existing) affected by construction procedures shall be free of all extraneous materials.
2. Pipelines shall be clean at the completion of work.

#### **B. Final Cleanup and Inspection**

1. Remove the following:
  - a. Temporary offices and storage structures.
  - b. Temporary fencing and roads.
  - c. Surplus material and rubbish.
  - d. Material (liquid or solid) resulting from cleaning operations.
2. The Engineer and Owner may make a final inspection of the work during the progress of the final cleaning and repairing. Any portion of the work accepted by the Owner shall be kept clean by the Contractor until final acceptance of the entire project.
3. During construction, clean up as the Work proceeds. Keep the premises free of accumulations of waste materials and earth, rubbish and other debris resulting from the work.
4. All debris, waste materials and salvaged materials, unless required by the Specifications to be reused or delivered to the Owner, shall become the property of the Contractor and shall be removed from the construction site.
5. Generally, the transportation of materials to and from the sites shall be over regular streets. When the Contractor's operations or that of its shippers, haulers, or subcontractors are such that dirt, mud, or debris is spilled or otherwise deposited on streets, driveways, sidewalks, or other thoroughfares, clean up the large chunks before the close of every day's

operations or before it is broken up or becomes impacted on the surface. In case of dispute or Contractor's failure to perform this cleanup work, the Owner may clean the streets and walks, remove the rubbish, etc., and will charge the cost to the Contractor, by withholding monies due to cover all charged work.

6. After completion of work in any of the site work areas, remove all waste materials, rubbish and debris from and about the premises as well as all tools and surplus materials, and leave the sites clean and ready for occupancy by the Owner. Restore to original condition any roads, utilities, walks, buildings, etc. disturbed or damaged by the Contractor's operations.
7. Open burning of debris will not be permitted unless specifically authorized in writing by the Owner, and then only following state, municipal or other local codes, ordinances, rules or regulations.

**END OF SECTION**

**SECTION 33 31 00**  
**SANITARY SEWERAGE PIPING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Sanitary Sewer Services Installation

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - ASTM A575 Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
  - ASTM C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
  - ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity - Flow Applications
  - ASTM D2774 Standard Practice for Underground Installation of Thermoplastic Pressure Piping
  - ASTM F1668 Standard Guide for Construction Procedures for Buried Plastic Pipe
  
- B. American Water Works Association (AWWA)
  - AWWA C105 Polyethylene Encasement for Ductile-Iron Pipe Systems
  - AWWA C600 Installation of Ductile-Iron Mains and Their Appurtenances
  - AWWA C605 Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings

**1.03 ALLOWANCES**

- A. If so stated in specification "Allowances", installation testing will be paid as an allowance. All other testing shall be incidental to the work.
  
- B. If there is no reference in the specification section "Allowances" to sewer collection system testing, then testing costs shall be included in the cost for sewer collection system.

## **1.04 SUBMITTALS**

- A. Action Submittals
  - 1. Product Data
    - a. Provide product data sheet.
- B. Informational Submittals
  - 1. Certificates
    - a. Certification of production date of all materials.
    - b. Manufacturer's certification that the materials were manufactured, sampled, tested, and inspected in accordance with this specification and appropriate referenced standards.
  - 2. Manufacturers' Instructions
    - a. Manufacturer's recommendations for assembly.

## **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery and Acceptance Requirements
  - 1. Inspect the pipe shipment to identify shifted loads, broken packaging or rough treatment, which could be an indication of damage.
  - 2. Pipe and fittings shall be marked as follows:
    - a. Manufacturer's name, trademark or logo.
    - b. Nominal size.
    - c. PVC cell classification.
    - d. Pipe stiffness designation, dimension ratio or schedule size and pressure class.
    - e. ASTM or AWWA specification designation.
    - f. Production date.
- B. Storage and Handling Requirements
  - 1. Unload the pipe in a manner that will not put stress on the pipe or strike anything causing damage.



2. Place and store the pipe package units on level ground stacked no more than 8 feet high. Do not store close to heat sources.
3. Store gaskets away from excessive exposure to heat, direct sunlight, ozone, oil or grease.
4. Store solvent cement in tightly sealed containers away from excessive heat.
5. Handle pipe in a manner to prevent impact blows, abrasion damage, gouging or cutting.
6. When handling pipe in cold weather, provide additional care to prevent damage due to impact.

## **PART 2 - PRODUCTS**

### **2.01 SANITARY SEWERAGE GRAVITY PIPING**

- A. Provide type of pipe shown on Drawings or stated in Bid Form.
- B. Do not use more than one material brand and manufacturer.
- C. Provide sanitary sewerage gravity pipe in accordance to the appropriate Specification Section.

### **2.02 MANHOLES**

- A. Provide manholes in accordance with the appropriate Specification Section.

### **2.03 PIPE EMBEDMENT MATERIAL**

- A. Soil Class A-7,  $\frac{3}{4}$ " crushed rock in accordance with the appropriate Specification Section.

### **2.04 ACCESSORIES**

- A. Insulation Board
  1. Extruded polystyrene conforming to ASTM C578, Type IV.
  2. Each board shall be 2 inches thick x 4 feet wide x 8 feet long
- B. Tracer Wire
  1. Provide in accordance to the appropriate Specification Section.

## **2.05 PREPARATION**

- A. Clean pipe interior and joints prior to installation. Keep pipe clean during construction.
- B. Install watertight plug to prevent water from entering the existing sewer system.

## **2.06 SANITARY SEWER GRAVITY MAINS INSTALLATION**

### **A. Separation of Water Mains and Sewers**

- 1. The following separations shall be minimum:
  - a. Parallel.
    - (1) 8 feet, measured center to center.
    - (2) Vertical (when pipelines cross or when horizontal clearance is impossible).
    - (3) Water Main Below a Sewer: 18 inches clear. (Both pipes shall be constructed of water main quality pipe and joints for ten feet either side of the crossing)
  - b. Water Main Above a Sewer: 6 inches clear.
- 2. When crossing a sewer, center a full length of water main or sewer to position joints as far as possible from sewer.
- 3. Coordinate relocation of any utilities within the work schedule.

### **B. General**

- 1. Begin pipe installation at the lowest point in the line proceeding upstream with the bell end of the pipe pointing upstream.
- 2. Utilize full length pipe except at manholes or service branches.
- 3. Use a saw to cut ends of pipe flush with inside wall of manholes and structures.
- 4. Provide cap, plug, or bulkhead at exposed ends of pipe upon completion of construction or whenever pipe installation is not in progress.
- 5. Vertical and Horizontal Alignment:
  - a. Install sewer pipe to maintain vertical and horizontal alignment as shown on the Drawings.

- b. Use laser equipment mounted in a manner to permit beam to shine through pipe.
  - c. Use a target to check each pipe installed.
  - d. Check laser beam alignment and grade a minimum of every 100 feet.
  - e. Use a fan to control air temperature variations in pipe and reduce bending of laser beam.
- 6. Install PVC pipe in accordance with requirements of ASTM D 2321.
  - 7. Commence pipe installation only after dewatering the trench below the trench bottom and necessary sheathing is in place.

C. Trenched Installation

- 1. Excavate trench and provide pipe bedding and backfill material in accordance to the appropriate Specification Section.
- 2. Prepare trench bottom to design line and grade so that only minor movement of the pipe is necessary after installation.
- 3. Lay pipe to design line and grade with set field grades to invert of pipe.
  - a. Do not allow horizontal and vertical alignment to vary from design line and grade at any structure by more than 1% of the inside diameter of the pipe or 1/4 inch, whichever is larger.
  - b. Do not allow the horizontal alignment of the pipe to vary from design line at any point along the pipe by more than 1% of the inside diameter of the pipe.
  - c. Low spots holding water exceeding the following depths for each pipe size are unacceptable and shall be removed and reinstalled to proper grade.

<b>Pipe Diameter</b>	<b>Maximum Low Spot Depth</b>
8"	1/2"
10"	1/2"
12"	3/4"
15"	3/4"
18" and Larger	5% of Pipe Diameter*

\*Measured to the nearest 1/2"

- 4. Provide uniform bearing for full pipe barrel length. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.

5. Do not lay pipe in water or on saturated soil or bedding, or allow water to rise in trench around pipe prior to placing backfill material.
6. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.
7. Install wye or tee service fitting at each location shown on the Drawings.
8. Assemble pipe joints in accordance with manufacturer's recommendations.
9. Push "home" the spigot end of the pipe joint in the socket before proceeding to install the next pipe.
10. When connecting to an existing sewer not terminating in a manhole, uncover the end of the existing sewer prior to laying sewer to allow horizontal and vertical adjustments.
11. Install pipe such that pipe joints are located far enough from the manhole outside wall to permit future pipe repair without damaging the manhole and the joints do not fall within manhole walls.
12. Provide pipe embedment as shown on the Drawings.

D. Trenchless Installation

1. Provide trenchless installation where shown on the Drawings in accordance with the appropriate Specification Section.

E. Manholes and Other Structures

1. Provide manholes where shown on the Drawings and make pipe connections in accordance to the appropriate Specification Section.
2. Provide flow lines and casting elevations from grade stakes and cut sheets provided by Engineer. Depths shown on Drawings are approximate.

F. Connecting to Existing Sanitary Sewer Structure

1. Excavate to verify location and depth of existing structure. Notify Engineer immediately if location and/or depth conflict with the Drawings.
2. Core drill a hole in the structure large enough to accommodate the pipe and a watertight flexible pipe to manhole connection seal.
3. Provide a watertight flexible pipe seal to manhole connection seal and commence pipe installation.

4. Mortar space around watertight flexible pipe seal to manhole connection seal so it is uniform with inside and outside barrel of manhole.

## **2.07 SANITARY SEWER SERVICES INSTALLATION**

- A. Provide sanitary sewer services at locations shown on the Drawings.
- B. Unless otherwise specified, terminate laterals (service connections) at the property line.
- C. In absence of grade stakes, install laterals deep enough to pick up lowest service point.
- D. Connect sanitary sewer services to new sewer pipe using in-line wyes.
- E. Sanitary sewer services installed following installation of sewer pipe or in existing pipe shall use pipe saddles in order to avoid damage to pipe and to insure proper joint.
- F. All connections installed in concrete pipe shall use pipe saddles fitted over core drilled hole same size as lateral.
- G. Bends used at wye and where necessary in lateral shall be no greater than 45 degrees.
- H. Install sanitary sewer services as nearly as possible at right angles to sewer pipe and extended to property line.
- I. Maintain minimum depth at property line of 10 feet below finished street grade, if possible.
- J. Minimum grade shall be 1/8 inch per foot.
- K. Plug sanitary sewer services to withstand low pressure air testing.
- L. Install laterals in conformance with all plumbing codes and ordinances.
- M. Provide cleanouts required by plumbing codes and ordinances as part of the lateral installation.
- N. When a lateral is not connected for immediate use mark location in accordance with the appropriate Specification Sections.
- O. Risers:
  1. Provide risers to terminate at the property line.
  2. Provide 45° bends.

3. Place riser pipe on a minimum of 6" of bedding material on undisturbed soil.
- P. Connecting New Pipe to Existing Pipe
1. If pipes are of the same material and size, then use coupling of the same pipe material designed for coupling pipe of the same material and size.
  2. If pipes are of dissimilar material or dissimilar size or there is no coupling made of the same material, then provide a transition coupling with stainless steel shear ring. Provide bushings or inserts to maintain the flow line through the connection.

## **2.08 INSULATION FOR PIPE FROST SHIELD**

- A. Provide where shown on the Drawings.
- B. Install insulation board in an inverted "U" around the pipe.
- C. Install insulation board with the top insulation board the same width as the trench centered over the pipe.
- D. Install the sides of the U-shape 2 feet high with the bottom of the legs at least to the springline of the pipe.
- E. Install the insulation board in layers to provide a minimum thickness of 4" or the thickness stated on the Drawings.
- F. Install such that there are no voids under the insulation.

## **2.09 TRACER WIRE**

- A. Provide for all non-metallic sewer mains and for all non-metallic service laterals within public right-of-way.
- B. Provide in accordance to appropriate Specification Section.

## **2.10 FIELD QUALITY CONTROL**

- A. Televiser sanitary sewer gravity mains in accordance to the appropriate Specification Section.
- B. Provide leakage testing of sanitary sewer gravity mains in accordance to the appropriate Specification Section.
- C. Provide deflection testing of sanitary sewer gravity mains in accordance to the appropriate Specification Section.

- D. Provide alignment testing of sanitary sewer gravity main in accordance to the appropriate Specification Section.
- E. Provide tracer wire continuity testing in accordance to appropriate Specification Section.

## **2.11 RECORD KEEPING**

- A. Measure and record the following for future location:
  - 1. Service branch locations.
  - 2. Sanitary sewer service locations at the termination point.
  - 3. Riser lengths and location.

**END OF SECTION**

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**SECTION 33 42 00**  
**STORMWATER CONVEYANCE**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Storm Sewer Pipe Installation
  - 2. Apron Endwalls Installation
  - 3. Drain Tile
  - 4. Connect to Existing Storm Sewer
  - 5. Connect to Existing Storm Sewer Manhole
  - 6. Culvert Pipe Installation
  - 7. PVC Yard Drains Installation
  - 8. Lateral Installation
- B. Products Installed but not Furnished or Supplied Under this Section.

**1.02 REFERENCES**

- A. American Concrete Pipe Association (ACPA)  
Concrete Pipe and Box Culvert Installation Manual
- B. American Society for Testing and Materials (ASTM):
  - ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity - Flow Applications
  - ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
  - ASTM F667 Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
- C. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO M36 Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
  - AASHTO M170 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

- AASHTO M252 Standard Specification for Corrugated Polyethylene Drainage Pipe
- AASHTO M294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter

- D. National Corrugated Steel Pipe Association (NCSPA)  
Installation Manual for Corrugated Steel Pipe and Structural Plate

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Action Submittals
  - 1. Product Data
    - a. Provide product data sheet(s).
- B. Informational Submittals
  - 1. Certificates
    - a. Certification of production date of all materials.
    - b. Manufacturer's certification that the materials were manufactured, sampled, tested, and inspected in accordance with this specification and appropriate referenced standards.
  - 2. Manufacturers’ recommendations for assembly.

## **PART 2 - PRODUCTS**

### **2.01 STORM SEWER PIPING**

- A. Provide type of pipe shown on Drawings or stated in Bid Form.
- B. Do not use more than one material brand and manufacturer.
- C. Provide storm sewer pipe in accordance to the appropriate Specification Section.

## **2.02 CULVERT PIPE**

- A. Provide culvert pipe in accordance to the appropriate Specification Section.

## **2.03 DRAIN TILE**

- A. Provide drain tile pipe shall be in accordance to AASHTO M252, type CP, and AASHTO M294, type CP, with class 2 perforations.
- B. Geotextile
  - 1. Drain tile shall be wrapped with knitted, woven, or non-woven fibers of polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride geotextile fabric.
  - 2. Provide knitted geotextile wraps that form a seamless sleeve and fit tightly over the pipe.

## **2.04 MANHOLES, INLETS AND CATCH BASINS**

- A. Provide manholes, inlets, and catch basins in accordance with the appropriate Specification Section.

## **2.05 PIPE EMBEDMENT MATERIAL**

- A. Soil Class A-7, ¾" crushed rock in accordance with the appropriate Specification Section.

## **2.06 ACCESSORIES**

- A. Apron End Walls
  - 1. For CMP pipes, provide apron end walls conforming to AASHTO M36. Do not use HDPE apron end walls.
  - 2. For RCP pipes, provide apron end walls conforming to AASHTO M170.
- B. Insulation Board
  - 1. Extruded polystyrene conforming to ASTM C578, Type IV.
  - 2. Each board shall be 2 inches thick x 4 feet wide x 8 feet long.
- C. Tracer Wire – Provide in accordance to the appropriate Specification Section.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Clean pipe interior and joints prior to installation. Keep pipe clean during construction.
- B. Install watertight plug to prevent water from entering the existing sewer system.
- C. Provide bypass pumping of existing connecting sewer in accordance to the appropriate Specification Section.

### **3.02 STORMWATER CONVEYANCE INSTALLATION**

- A. Separation of Water Mains and Sewers
  - 1. The following separations shall be minimum:
    - a. Parallel.
      - (1) 8 feet, measured center to center.
      - (2) Vertical (when pipelines cross or when horizontal clearance is impossible).
      - (3) Water Main Below a Sewer: 18 inches clear. (Both pipes shall be constructed of water main quality pipe and joints for ten feet either side of the crossing.)
    - b. Water Main Above a Sewer: 6 inches clear.
  - 2. When crossing a sewer, center a full length of water main or sewer to position joints as far as possible from sewer.
  - 3. Coordinate relocation of any utilities within the work schedule.
- B. General
  - 1. Begin pipe installation at the lowest point in the line proceeding upstream with the bell end of the pipe pointing upstream.
  - 2. Utilize full-length pipe except at manholes or service branches.
  - 3. Use a saw to cut ends of pipe flush with inside wall of manholes and structures.
  - 4. Provide cap, plug, or bulkhead at exposed ends of pipe upon completion of construction or whenever pipe installation is not in progress.

5. Vertical and Horizontal Alignment:
  - a. Install storm sewer pipe to maintain vertical and horizontal alignment as shown on the Drawings.
  - b. Use laser equipment mounted in a manner to permit beam to shine through pipe.
  - c. Use a target to check each pipe installed.
  - d. Check laser beam alignment and grade a minimum of every 100 feet.
  - e. Use a fan to control air temperature variations in pipe and reduce bending of laser beam.
6. Install PVC pipe in accordance with requirements of ASTM D 2321.
7. Commence pipe installation only after dewatering the trench below the trench bottom and necessary sheathing is in place.

C. Trenched Installation

1. Excavate trench and provide pipe bedding and backfill material in accordance to the appropriate Specification Section.
2. Prepare trench bottom to design line and grade so that only minor movement of the pipe is necessary after installation.
3. Lay pipe to design line and grade with set field grades to invert of pipe.
  - a. Do not allow horizontal and vertical alignment to vary from design line and grade at any structure by more than 1% of the inside diameter of the pipe or 1/4 inch, whichever is larger.
  - b. Do not allow the horizontal alignment of the pipe to vary from design line at any point along the pipe by more than 1% of the inside diameter of the pipe.
4. Provide uniform bearing for full pipe barrel length. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.
5. Do not lay pipe in water or on saturated soil or bedding, or allow water to rise in trench around pipe prior to placing backfill material.
6. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

7. Install wye or tee service fitting at each location shown on the Drawings.
8. Assemble pipe joints in accordance with manufacturer's recommendations.
9. Push "home" the spigot end of the pipe joint in the socket before proceeding to install the next pipe.
10. When connecting to an existing sewer not terminating in a manhole, uncover the end of the existing sewer prior to laying sewer to allow horizontal and vertical adjustments.
11. Install pipe such that pipe joints are located far enough from the manhole outside wall to permit future pipe repair without damaging the manhole and the joints do not fall within manhole walls.
12. Provide pipe embedment as shown on the Drawings.

D. PVC Yard Drains

1. Install PVC Yard Drains in accordance with manufacturer's recommendations.

E. Concrete Pipe

1. Install in accordance to American Concrete Pipe Association "Concrete Pipe and Box Culvert Installation Manual".
2. Circular concrete pipe with elliptical reinforcing shall be placed so reference lines indicating top of pipe are not more than 5 degrees from vertical plane through longitudinal axis of pipe.
3. Install RCP apron endwall at all culvert inlet and outlet locations.
4. Last three joints shall be tied at all culvert inlet and outlet locations with two pipe connections per joint.
5. All joints shall be tied where the pipe slope exceeds 20%.

F. Corrugated Metal Pipe

1. Install in accordance to National Corrugated Steel Pipe Association "Installation Manual for Corrugated Steel Pipe and Structural Plate".
2. Install corrugated metal pipe apron endwall at all culvert inlet and outlet locations with two pipe connections per joint.

### **3.03 CONNECT TO EXISTING STORM PIPE**

- A. Excavate to verify location, direction, and depth of existing pipe stubs. Notify Engineer immediately if actual location, direction, and/or depth conflict with the Drawings.
- B. Remove any plugs or partial sections and commence pipe installation at nearest existing bell.

### **3.04 CONNECT TO EXISTING STORM STRUCTURE**

- A. Excavate to verify location and depth of existing structure. Notify Engineer immediately if location and/or depth conflict with the Drawings.
- B. Create opening in existing structure and commence pipe installation.
- C. Grout space between pipe and existing structure so area is watertight and uniform with inside and outside of structure.

### **3.05 LATERAL INSTALLATION**

- A. Verify location and depth of existing sump discharge. Notify Engineer immediately if location and/or depth conflict with the Drawings.
- B. Tracer wire is required.
- C. Laterals shall be connected to new sewer pipe using in-line wyes.
- D. Bends used at wye and where necessary in lateral shall be no greater than 45 degrees.
- E. Laterals shall be laid nearly as possible at right angles to sewer pipe and extended to property line, unless noted otherwise in the Drawings.
- F. Minimum grade shall be 1/8 inch per foot.
- G. When risers are required, they shall be laid at 45-degree slope on undisturbed soil or mechanically compacted backfill.
  - 1. In order to place riser at main, Contractor must dig down at property line to confirm 1% slope can be attained, and at the water main to confirm 6" of separation can be attained. If not, riser must be placed at property line connection.
- H. Connection to existing sump discharges shall be made with a Ferno connection or acceptable alternative, with stainless steel shear rings.
- I. Laterals extended to the property line, but not connected to existing sump discharges, shall be plugged to withstand low pressure air testing.

- J. Ends of laterals not being connected to existing sump discharges shall be marked with a 2" x 6" or 4" x 4" composite wood post positioned directly over the end of the lateral with top of post being flush with finished grade. A 2-foot-long, ½ inch minimum diameter, iron rod shall be placed beside composite wood post and fastened appropriately to facilitate location of lateral in the future.
- K. Record the location, length and number of bends at laterals on record drawings. Location shall be measured from the closest downstream manhole.
- L. Remove and dispose of existing lateral if new installation is a replacement of an existing service.

### **3.06 CLEANING**

- A. Clean existing culverts by jetting method where shown in the Drawings.

**END OF SECTION**



**SECTION 33 46 11**  
**STORM WATER PONDS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes
  - 1. Wet Detention Basin Liner
  - 2. Wet Detention Basin

**1.02 REFERENCES**

- A. American Society for Testing and Materials (ASTM)
  - ASTM D422 Standard Test Method for Particle-Size-Analysis
  - ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))
  - ASTM D1556 Test for Density of Soil in Place by the Sand-Cone Method
  - ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Lb (4.54 kg) Rammer and 18 in. (457 mm) Drop
  - ASTM D2167 Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
  - ASTM D2487 Standard Test Method for Classification of Soils for Engineering Purposes
  - ASTM 2937 Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method
  - ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
  - ASTM D5084 Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
  
- B. American Association of State Highway and Transportation Officials (AASHTO)
  - AASHTO T99 Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305mm (12-in.) Drop
  - AASHTO T191 Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method
  
  - AASHTO T310 Standard Method of Test for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

### **1.03 ALLOWANCES**

- A. If so stated in the specification “Allowances”, installation testing will be paid as an allowance. All other testing will be incidental to the Work.
- B. If there is no reference in the specification section to “Allowances”, then testing costs will be incidental to other Work items.

### **1.04 SUBMITTALS**

- A. Informational Submittals
  - 1. Field or Site Quality Control Submittals –Submit two (2) copies of the results of quality control testing (include location where tests were performed).

### **1.05 QUALITY ASSURANCE**

- A. Clay Liner: An independent testing laboratory approved by the Owner shall be obtained by the Contractor and provide quality control testing.
  - 1. Compaction
    - a. The clay liner shall be compacted to a minimum of standard proctor dry density (ASTM D698) or to a minimum of 90% of modified proctor dry density (ASTM D1557), at a moisture content above optimum moisture.
  - 2. Control of Moisture
    - a. During placement and compaction of the clay liner, the moisture content of the clay being placed shall be maintained above optimum moisture as determined by Standard Proctor Test (ASTM D698) or Modified Proctor Test (ASTM D1557).
    - b. The application of water to the clay shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the clay after placement and before compaction of the liner, if necessary. Uniform moisture distribution shall be obtained by disking.
  - 3. Testing and Documentation Requirements
    - a. Liner construction shall be tested and documented as specified below. Copies of the documentation report, including test locations and test results, shall be provided to the Engineer.

- b. Field and laboratory soil test shall be completed on the clay liner, by an independent testing firm retained by the Contractor, to document compliance with this specification. Testing shall be completed as the liner is being placed. The following test shall be completed at the specified frequency.

Testing Category and Standards:	Number of Acceptable Tests:
Standard Proctor Test (ASTM D698) OR Modified Proctor Test (ASTM D1557)	1 test per 5,000 cubic yards of clay liner
Field Density Tests (D2937, or D2167, or D1556)	1 test per 100-foot grid per 1 foot thickness of clay liner
Atterberg Limit Tests (ASTM D4318)	1 test per 1,500 cubic yards of clay liner
Grain Size Distribution (ASTM D422)	1 test per 1,500 cubic yards of clay liner
Permeability (ASTM D5084)	1 test per 5,000 cubic yards of clay liner (2 minimum per facility)

- c. Atterberg limits, grain size distribution, and permeability tests shall be completed on undisturbed samples obtained from the constructed clay liner. A minimum of one of each of the laboratory tests specified above shall be completed per clay liner.
- d. All test holes shall be backfilled using powdered bentonite mixed with clay soil used in liner construction and compacted by hand tamping. The clay shall be broken down into clods less than ½ inch in diameter. A minimum of 25% of the backfilled test hole volume shall be occupied by powdered bentonite after backfilling.

4. Provide Additional Density and Gradation Testing:

- a. Change in method of compaction.
- b. Change in source or quality of soil or aggregate.
- c. Disturbed cut areas.

- B. When the testing results show that the Work is of an acceptable nature, the acceptance of the work shall not relieve the Contractor from making corrections to the tested work during the warranty period.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. General
  - 1. Stripped and/or excavated soils shall be segregated and stockpiled for use on the site as intended and indicated by the Drawings.
- B. Topsoil
  - 1. Material shall be natural on-site upper layer of soil consisting of loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils able to sustain plant life.
- C. Wetland Topsoil
  - 1. Material shall consist of moist organic soil, including any existing wetland vegetation and seeds. Material shall be excavated from areas shown on the Drawings, stockpiled and protected from contamination of other soils. Handling of material shall be in compliance with associated permits / permitting authorities / regulatory agencies.
- D. Fill and Borrow
  - 1. Material shall consist of satisfactory soil or a mixture of satisfactory soil, stone, gravel or other acceptable materials, of a character and quality satisfactory for the purpose intended. Use material free from sod, stumps, logs, and other perishable and deleterious matter.
  - 2. As a minimum, all soil shall meet the requirements of Soil Class G-1 as specified in appropriate Specification Section.
- E. Embankments
  - 1. For embankments that will function as temporary or permanent water impoundments for ponds or small dams, the following shall apply:
    - a. Satisfactory soil materials are those complying with ASTM D2487 soil classification groups GC, GM, SC, SM, CL, ML, CH, and MH or as determined by Engineer.
    - b. Unsatisfactory soil materials are those complying with ASTM D2487 soil classification groups GW, GP, SW, SP, OL, OH and PT or as determined by Engineer.
- F. Pond Liner
  - 1. Clay Basin Liner

- a. Soils used in construction of the clay liner shall have a minimum plasticity index of 12 as tested in accordance with ASTM D4318, a minimum percentage passing the number 200 sieve.
- b. Clay materials shall contain no sod, brush, roots, frozen soil, or other perishable materials. Rock particles larger than 3 inches shall be removed prior to compaction of the clay.
- c. In situ clay material shall be scarified and recompactd if sand seams are observed as a result of inspecting the clay material after pond construction has been completed to the elevations indicated on the Drawings. Verify that in situ clay material is consistently at the thickness specified for clay liner.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Prior to the start of soil disturbing activities, perform the following:
  1. Install erosion control devices and measures as specified in the appropriate Specification Section and as indicated on the Drawings.
  2. Clear and grub as specified in the appropriate Specification Section and as indicated on the Drawing.
  3. Remove and dispose of site debris. All debris materials removed from the project site shall be disposed of at a legally approved site. No burning of materials is permitted onsite
- B. Perform topsoil stripping, excavation, fill, grading, compaction and topsoil placement in accordance to the appropriate Specification Section.

### **3.02 WET DETENTION BASIN**

- A. In addition to items of work specified elsewhere, the following procedures shall apply to construction of wet detention basins.
  1. Contractor shall partially excavate wet detention basin to act as a sediment trap during construction.
  2. Contractor shall complete excavation and shaping of wet detention basin upon establishment of upstream restoration.
  3. Contractor shall finish areas to receive topsoil to within not more than 0.10 feet above or below required subgrade elevations.

### 3.03 CLAY BASIN LINER

#### A. Foundation Preparation

1. Foundation surfaces shall be graded to remove surface irregularities and shall be scarified or otherwise acceptably scored or loosened to a minimum depth of 2 inches.
2. The moisture content of the loosened material shall be controlled as specified for the clay liner, and the surface materials of the foundation shall be compacted and bonded with the first layer of the clay liner as specified for subsequent layers of clay liner.
3. Over-excavation and/or under filling of soil to allow placement of the specified liner thickness in accordance with finish grades as shown on Drawings shall be considered incidental to wet detention basin liner.
4. Liner Thickness
  - a. Provide a 12” thick layer (in-place) of material on the sides and base of the wet detention basin below the permanent pool elevation to act as a liner to ensure retention of water.
5. Placement
  - a. The clay liner shall not be placed until the required foundation preparation has been completed and the foundation has been inspected and approved. The clay liner shall not be placed upon frozen surface, nor shall snow, ice, or frozen material be incorporated in the clay liner.
  - b. The clay liner shall be placed in lifts. The thickness of each lift before compaction shall not exceed the smaller of 6 inches or the length of the teeth of the footed compactor used.
  - c. The distribution of materials throughout the clay liner shall be essentially uniform, and the clay liner shall be free from pockets, streaks, or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material.
  - d. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified to a depth of not less than 2 inches before the next layer is placed.

**END OF SECTION**

# CONSTRUCTION DRAWINGS FOR CTH N STORM WATER MANAGEMENT FACILITY YARD WASTE TRANSFER SITE CONSTRUCTION

CONTRACT NO. B-21  
TOWN OF BUCHANAN

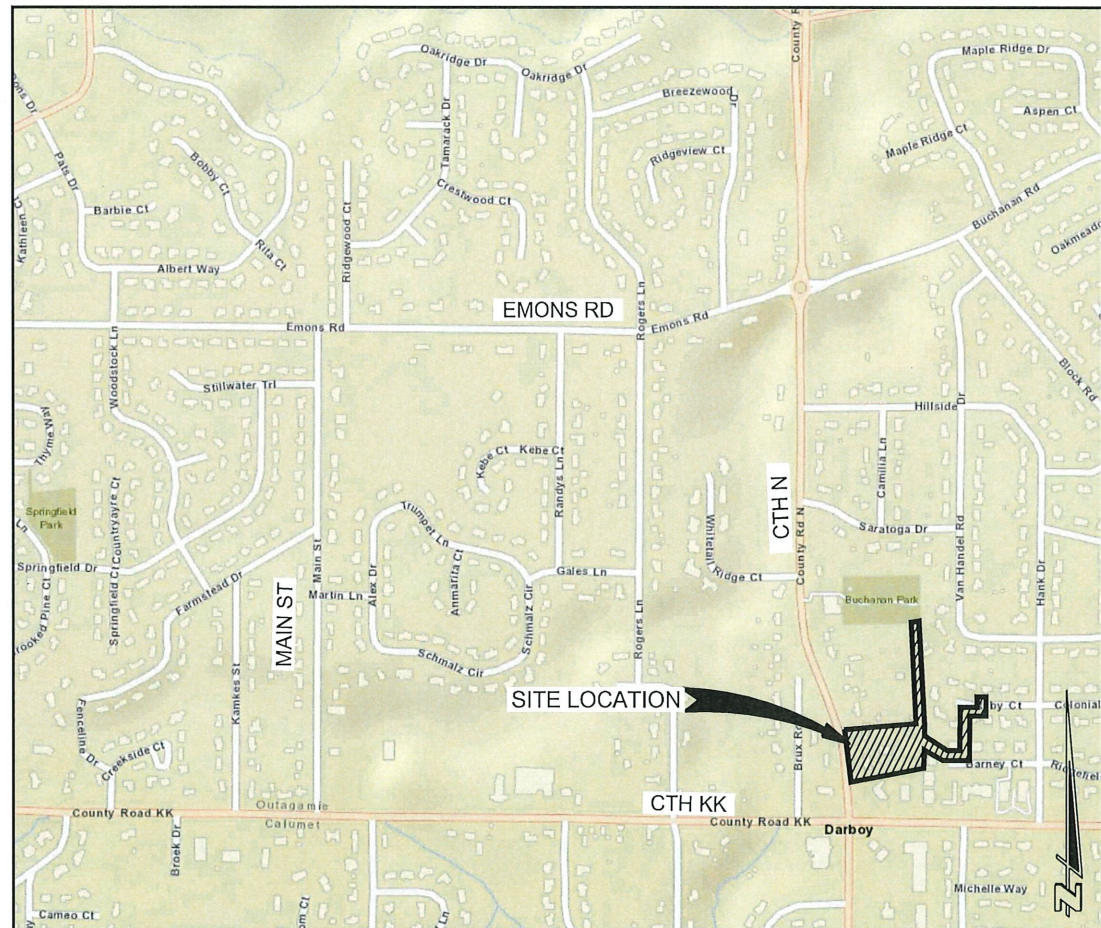
OUTAGAMIE COUNTY, WI

SEPTEMBER, 2021

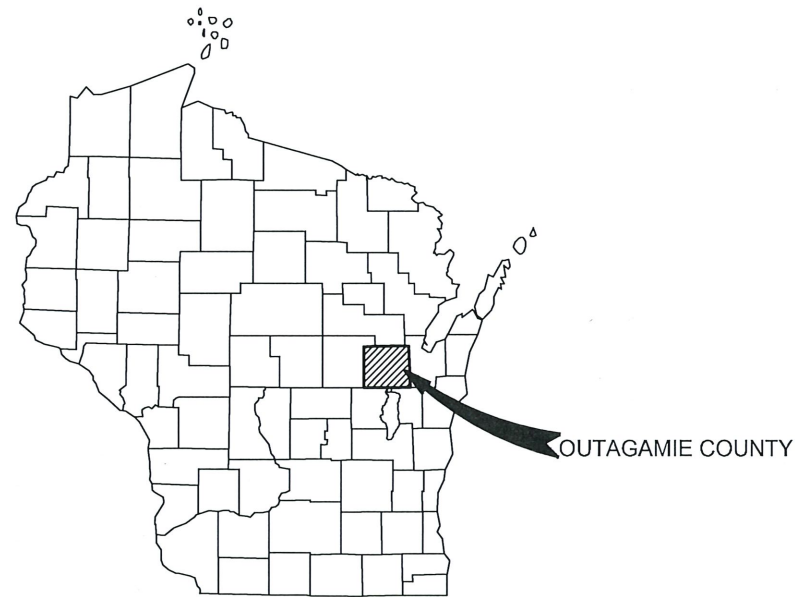
Prepared By



PROJECT I.D. 04916-0095/0100



SITE LOCATION MAP



COUNTY LOCATION MAP

**ATTENTION:**  
DOWNLOADED PLANS ARE NOT SCALABLE, NEITHER THE OWNER NOR THE ENGINEER SHALL BE HELD RESPONSIBLE FOR THE SCALE OR PRINT QUALITY OF DOWNLOADED PLANS. ONLY PRINTED PLANS FROM CEDAR CORPORATION SHALL BE CONSIDERED TO BE SCALEABLE PLANS.

INDEX TO DRAWINGS

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1	TITLE SHEET
2	STANDARD SYMBOLS ABBREVIATIONS & STAMPS
3	TRAFFIC CONTROL AND ACCESS PLAN
4	YARD WASTE AND POND EXISTING CONDITIONS
5	YARD WASTE AND POND REMOVAL PLAN
6	YARD WASTE AND POND SITE PLAN
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8	YARD WASTE AND POND CROSS SECTIONS
9 - 10	STORM SEWER OUTFALL PLAN AND PROFILE
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13	RUBY COURT STORM SEWER EASEMENT PLAN AND PROFILE
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STAMPS

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MAPPING & TOPOGRAPHY SYMBOLOGY

DESCRIPTION	EXISTING SYMBOL	PROPOSED SYMBOL
SANITARY SEWER (PLAN) - LENGTH-DIA. MATERIAL @ GRADE	(SIZE & MAT'L.) SAN	LENGTH - SIZE MATL SAN
STORM SEWER (PLAN) - LENGTH-DIA. MATERIAL @ GRADE	(SIZE & MAT'L.) STM	LENGTH - SIZE MATL STM
WATER MAIN (PLAN)- LENGTH-DIA. MATERIAL-(FITTING-FITTING)	(SIZE & MAT'L.) WTR	LENGTH - SIZE MATL WTR
SANITARY SEWER (PROFILE) - LENGTH-DIA. MATERIAL @ GRADE	(SIZE & MAT'L.)	XXX'- XX" PVC SAN @ 0.00%
SANITARY FORCEMAIN (PROFILE) - DIA. MATERIAL	(SIZE & MAT'L.)	XXX'- XX" FORCEMAIN @ 0.00%
STORM SEWER (PROFILE) - LENGTH-DIA. MATERIAL @ GRADE	(SIZE & MAT'L.)	XXX'- XX" RCP STM @ 0.00%
WATER MAIN (PROFILE)- DIA. MATERIAL	(SIZE & MAT'L.)	X" PVC WM.
GAS MAIN	GAS	GAS
ELECTRIC - BURIED	UGE	UGE
ELECTRIC - OVERHEAD	OE	OE
TELEPHONE - BURIED	TEL	TEL
TELEPHONE - BURIED (FIBER OPTIC)	FO	FO
TELEPHONE - OVERHEAD	OH	OH
CABLE TELEVISION - BURIED	TV	TV
CABLE TELEVISION - OVERHEAD	OH	OH
CENTERLINE		
RIGHT-OF-WAY LINE		
PROPERTY LINE		
PAVEMENT (STREET, DRIVE, SIDEWALK, ETC.)		
GRAVEL		
CURB & GUTTER		
RAILROAD		
GUARDRAIL		
FENCE - AS LABELED		

GENERAL NOTES:

1. THESE DRAWINGS ARE NEITHER A LEGALLY RECORDED MAP, NOR A SURVEY, AND IS NOT INTENDED TO BE USED AS ONE.
2. ALL PROPERTY LINES SHOWN ARE ESTABLISHED FROM COUNTY GIS FILES. PROPERTY LINES MAY NOT REFLECT ACTUAL LOT LINE LOCATIONS AND ARE FOR INFORMATIONAL PURPOSES ONLY.
3. UTILITY LOCATIONS SHOWN ON THE PLANS WERE PROVIDED BY THE UTILITY OWNER. FIELD LOCATIONS MAY VARY AND ADDITIONAL UTILITIES MAY EXIST. CONTRACTOR SHALL CONTACT DIGGERS HOTLINE A MINIMUM OF 3 WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION.
4. ALL LENGTHS OF PROPOSED UTILITIES SHOWN ON THE PLANS ARE PER DESIGN, ACTUAL LENGTHS MAY VARY DURING CONSTRUCTION.

MAPPING & TOPOGRAPHY SYMBOLOGY

DESCRIPTION	EXISTING SYMBOL	PROPOSED SYMBOL
BENCHMARK		
CATCH BASIN/INLET		
CONTROL POINT		
CULVERT	(DIA. & TYPE)	(LENGTH-DIA. & TYPE)
CURB STOP		G OR W
ELECTRIC PEDESTAL		
FIRE HYDRANT		
IRON PIPE = IP IRON ROD = IR	OR	IP OR IR
LIGHT - ORNAMENTAL		
LIGHT - STREET		
MAILBOX		
MANHOLE ELECTRIC		
MANHOLE GAS		
MANHOLE MISCELLANEOUS		MH
MANHOLE SANITARY		SAN MH
MANHOLE SIGNAL		SIG MH
MANHOLE STORM		STM MH
MANHOLE STORM INLET CATCH BASIN		
MANHOLE WATER		
MANHOLE TELEPHONE		
METER - GAS		
METER - WATER		
PEDESTAL CABLE TV		
PEDESTAL TELEPHONE		
SIGN		
BUSH CONIFER		
BUSH DECIDUOUS		
TREE DECIDUOUS/INCH DIA	12"	
TREE CONIFEROUS/INCH DIA	10"	
TREE LINE		
VALVE: W=WATER, G=GAS	OR	W OR G
UTILITY POLE		
SILT FENCE	SF	SF
MAJOR CONTOURS	890	890
MINOR CONTOURS		
SPOT ELEVATIONS	+891.2	+891.22
INLET PROTECTION		
PROPOSED ASPHALT PAVEMENT		
PROPOSED GRAVEL		
PROPOSED CONCRETE		

LIST OF STANDARD ABBREVIATIONS

ASPH	ASPHALT	NTS	NOT TO SCALE
B/B	BACK TO BACK	PC	POINT OF CURVATURE
BOC	BACK OF CURB	PCC	POINT OF COMPOUND CURVE
BLDG	BUILDING	PED	PEDESTAL
BM	BENCHMARK	PVMT	PAVEMENT
BSMT	BASEMENT	PI	POINT OF INTERSECTION
C	CUT	PL	PROPERTY LINE
C&G	CURB AND GUTTER	PP	POWER POLE
C/C	CENTER TO CENTER	PROP	PROPOSED
CABC	CRUSHED AGGREGATE BASE COURSE	PT	POINT OF TANGENCY
CB	CATCH BASIN	PVC	POLYVINYL CHLORIDE
CI	CAST IRON PIPE	PVC	POINT OF VERTICAL CURVATURE
CL	CENTERLINE	PVI	POINT OF VERTICAL INTERSECTION
CMP	CORRUGATED METAL PIPE	PVT	POINT OF VERTICAL TANGENCY
CO	CLEAN OUT	R	RANGE OR RADIUS
CONC	CONCRETE	RCP	REINFORCED CONCRETE PIPE
CP	CONTROL POINT	REBAR	REINFORCEMENT BAR
CTH	COUNTY TRUNK HIGHWAY	REQD	REQUIRED
CTV	CABLE TV	RL	REFERENCE LINE
CS	CURB STOP	ROW	RIGHT-OF-WAY
DIA	DIAMETER	SAN	SANITARY
DI	DUCTILE IRON PIPE	WALK	SIDEWALK
EA	EACH	SF	SILT FENCE
ELEC	ELECTRIC (E WHEN USED IN LINE STYLE)	SL	SANITARY LATERAL
EP	EDGE OF PAVEMENT	SHLDR	SHOULDER
EXIST	EXISTING	STA	STATION
FH	FIRE HYDRANT	STH	STATE TRUNK HIGHWAY
FL	FLOW LINE	STM	STORM OR STORM SEWER
FM	FORCE MAIN	TEL	TELEPHONE
FO	FIBER OPTIC	TEMP	TEMPORARY
G	GAS	TOC	TOP OF CURB
GV	GAS VALVE	TYP	TYPICAL
GW	GUY WIRE	VC	VERTICAL CURVE
INV	INVERT	WM	WATER MAIN
IP	IRON PIPE OR PIN	WS	WATER SERVICE
L	LENGTH (OF CURVE)	WV	WATER VALVE
LC	LONG CHORD OF CURVE		
LP	LIGHT POLE		
MB	MAILBOX		
MG	METER-GAS		
MH	MANHOLE		

BENCHMARKS

1	NGS "4X75"	749.25
2	CHISELED 'X' ON NE BOLT ON HYDRANT AT SW CORNER OF N130 CTH N	750.64
3	SAN MH RIM NEAR NW CORNER OF N130 CTH N	748.26
4	BURY BOLT 6-6 ON HYDRANT AT WEST END OF RUBY COURT	748.36

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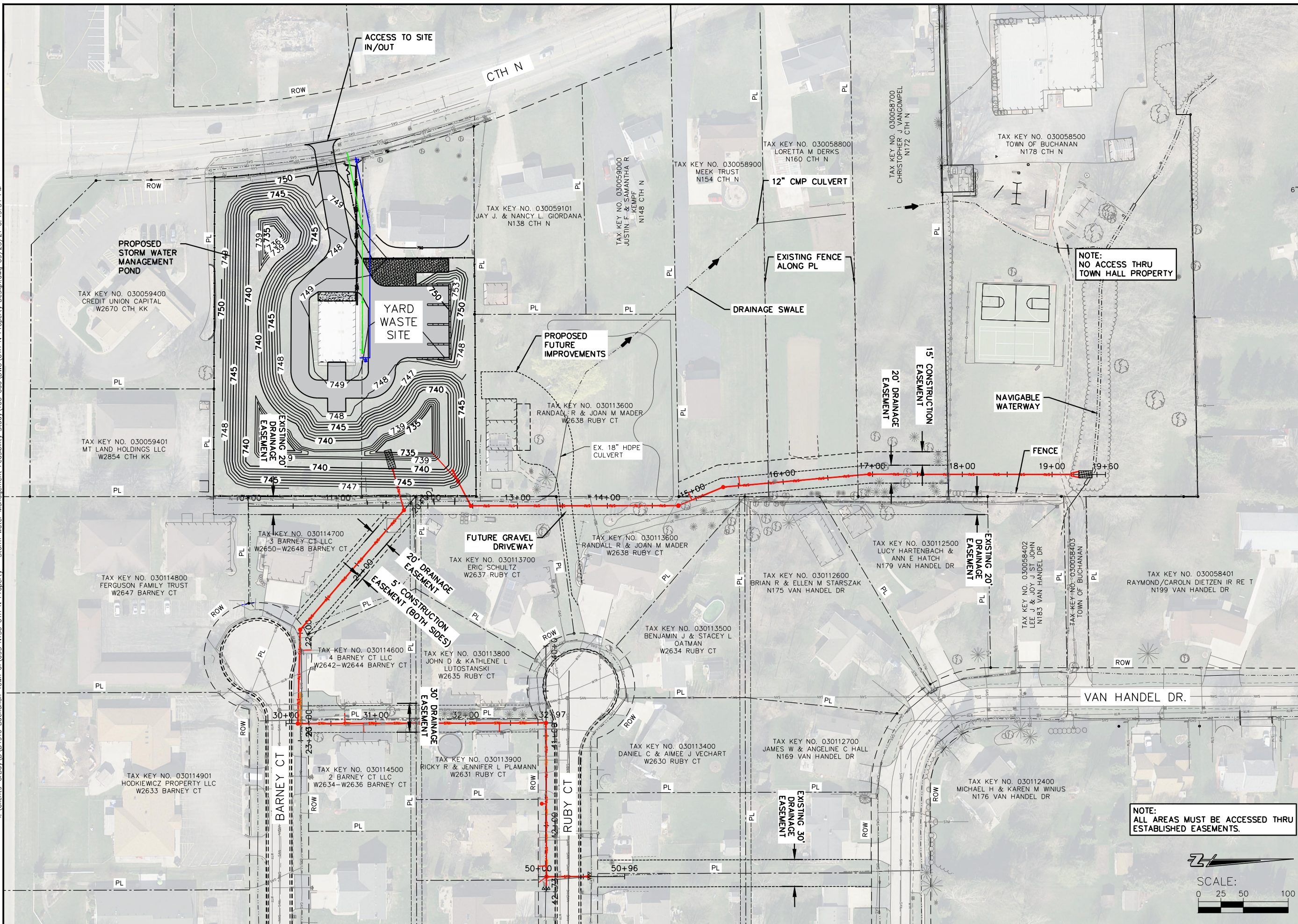
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TOWN OF BUCHANAN  
N130 CTH N PROPERTY - STORM WATER MANAGEMENT  
CONTRACT NO. B-21  
STANDARD SYMBOLS AND ABBREVIATIONS



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ACCESS TO SITE IN/OUT

CTH N

PROPOSED STORM WATER MANAGEMENT POND

YARD WASTE SITE

PROPOSED FUTURE IMPROVEMENTS

12" CMP CULVERT

EXISTING FENCE ALONG PL

DRAINAGE SWALE

15' CONSTRUCTION EASEMENT  
20' DRAINAGE EASEMENT

NOTE:  
NO ACCESS THRU TOWN HALL PROPERTY

NAVIGABLE WATERWAY

FENCE

FUTURE GRAVEL DRIVEWAY

20' DRAINAGE EASEMENT  
5' CONSTRUCTION EASEMENT (BOTH SIDES)

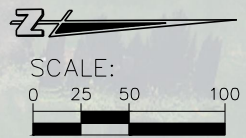
EXISTING 20' DRAINAGE EASEMENT

VAN HANDEL DR.

30' DRAINAGE EASEMENT

EXISTING 30' DRAINAGE EASEMENT

NOTE:  
ALL AREAS MUST BE ACCESSED THRU ESTABLISHED EASEMENTS.



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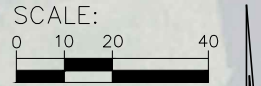
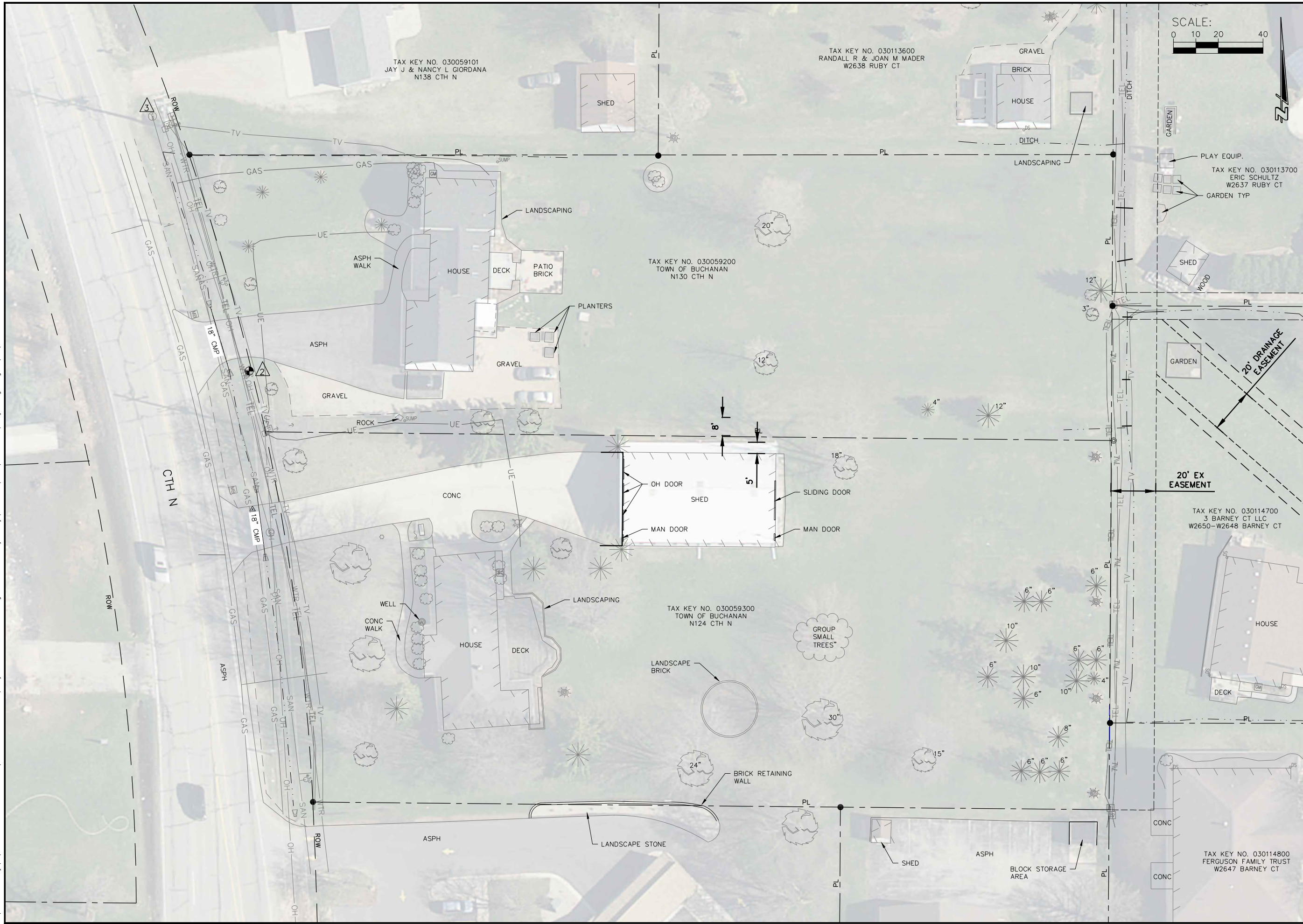
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TRAFFIC CONTROL AND ACCESS PLAN

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**TOWN OF BUCHANAN**  
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CONTRACT NO. B-21  
YARD WASTE AND POND EXISTING CONDITIONS

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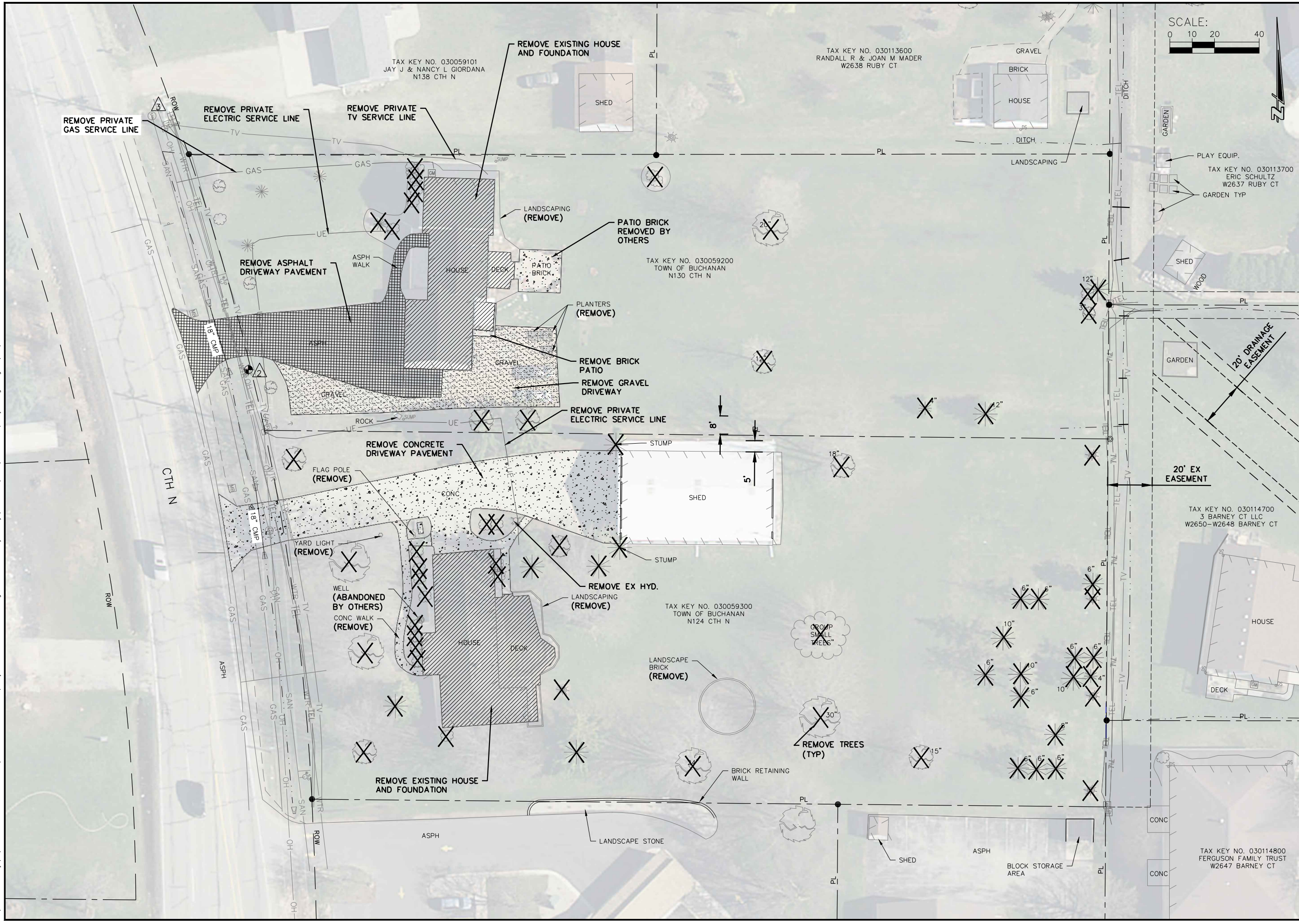
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**TOWN OF BUCHANAN**  
**N130 CTH N PROPERTY - STORM WATER MANAGEMENT**  
**CONTRACT NO. B-21**  
**YARD WASTE AND POND REMOVAL PLAN**



TAX KEY NO. 030114700  
3 BARNEY CT. LLC  
W2650-W2648 BARNEY CT

TAX KEY NO. 030114800  
FERGUSON FAMILY TRUST  
W2647 BARNEY CT

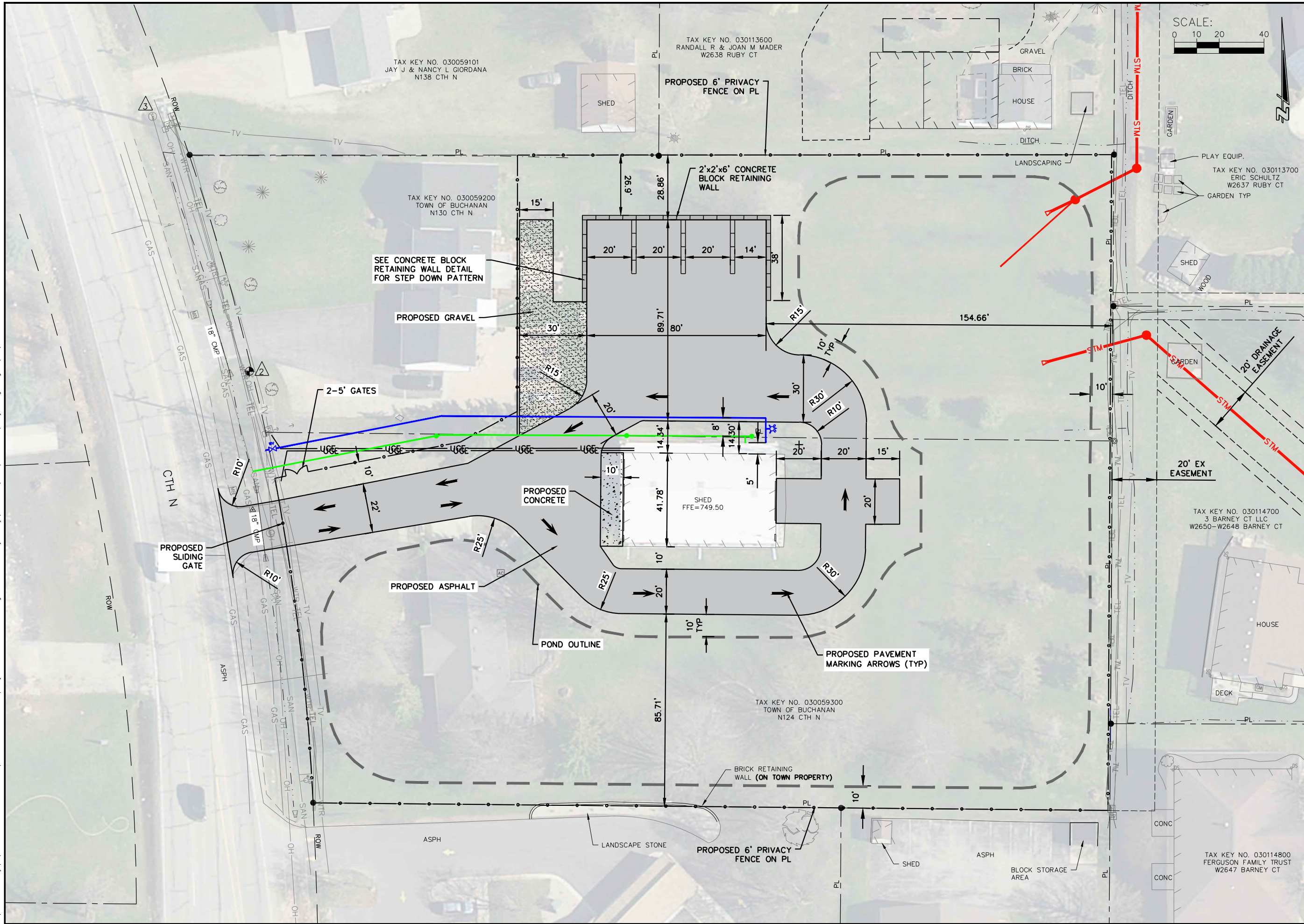
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N130 CTH N

TAX KEY NO. 030059300  
TOWN OF BUCHANAN  
N124 CTH N

TAX KEY NO. 030059101  
JAY J & NANCY L GIORDANA  
N138 CTH N

TAX KEY NO. 030113600  
RANDALL R & JOAN M MADER  
W2638 RUBY CT

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**TOWN OF BUCHANAN**  
N130 CTH N PROPERTY - STORM WATER MANAGEMENT  
CONTRACT NO. B-21  
YARD WASTE AND POND SITE PLAN

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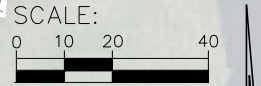
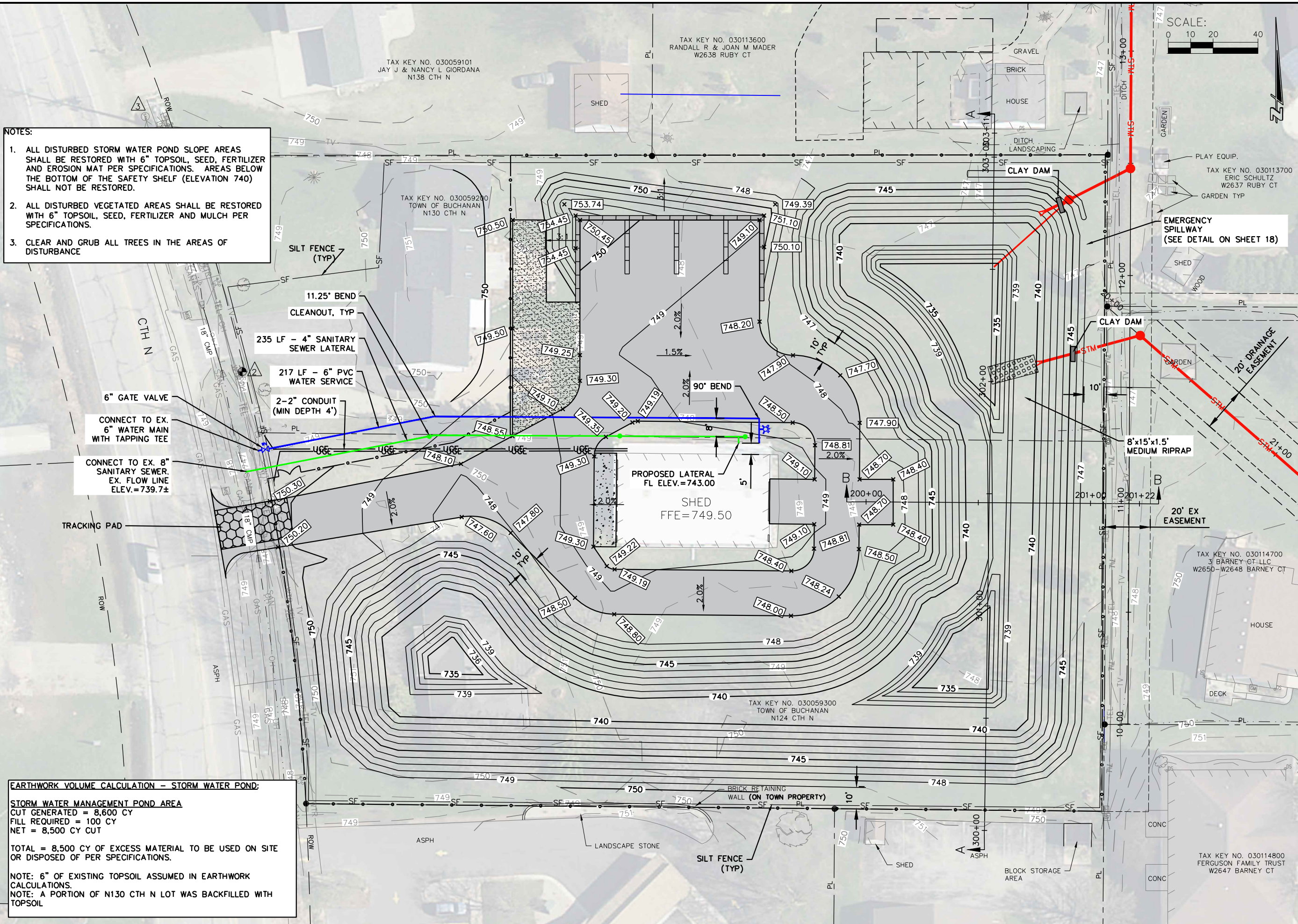
- NOTES:**
1. ALL DISTURBED STORM WATER POND SLOPE AREAS SHALL BE RESTORED WITH 6" TOPSOIL, SEED, FERTILIZER AND EROSION MAT PER SPECIFICATIONS. AREAS BELOW THE BOTTOM OF THE SAFETY SHELF (ELEVATION 740) SHALL NOT BE RESTORED.
  2. ALL DISTURBED VEGETATED AREAS SHALL BE RESTORED WITH 6" TOPSOIL, SEED, FERTILIZER AND MULCH PER SPECIFICATIONS.
  3. CLEAR AND GRUB ALL TREES IN THE AREAS OF DISTURBANCE

**EARTHWORK VOLUME CALCULATION - STORM WATER POND:**

**STORM WATER MANAGEMENT POND AREA**  
 CUT GENERATED = 8,600 CY  
 FILL REQUIRED = 100 CY  
 NET = 8,500 CY CUT

TOTAL = 8,500 CY OF EXCESS MATERIAL TO BE USED ON SITE OR DISPOSED OF PER SPECIFICATIONS.

NOTE: 6" OF EXISTING TOPSOIL ASSUMED IN EARTHWORK CALCULATIONS.  
 NOTE: A PORTION OF N130 CTH N LOT WAS BACKFILLED WITH TOPSOIL



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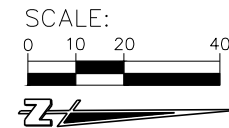
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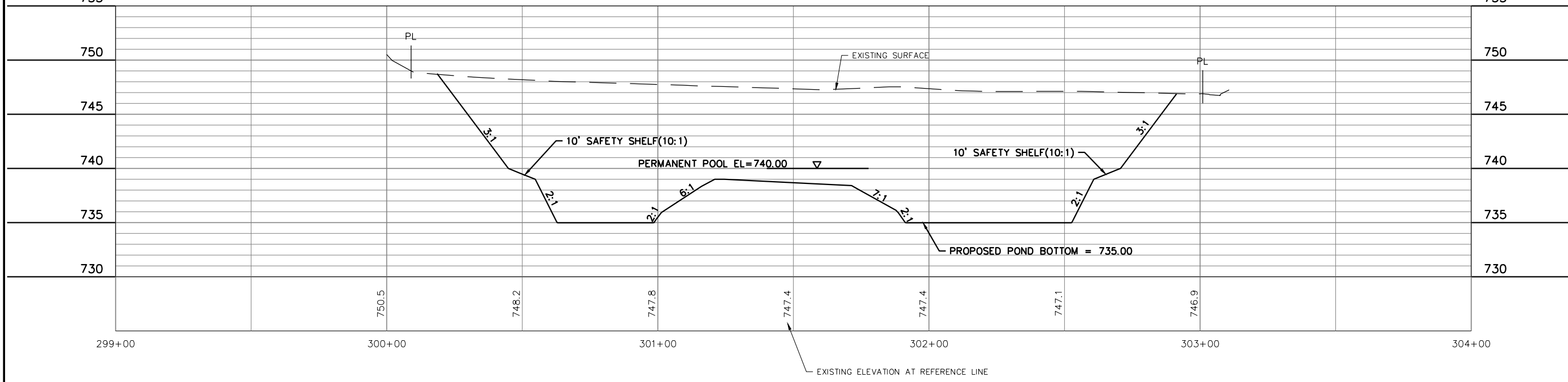
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**TOWN OF BUCHANAN**  
 N130 CTH N PROPERTY - STORM WATER MANAGEMENT  
 CONTRACT NO. B-21  
 YARD WASTE AND POND GRADING & EROSION CONTROL PLAN

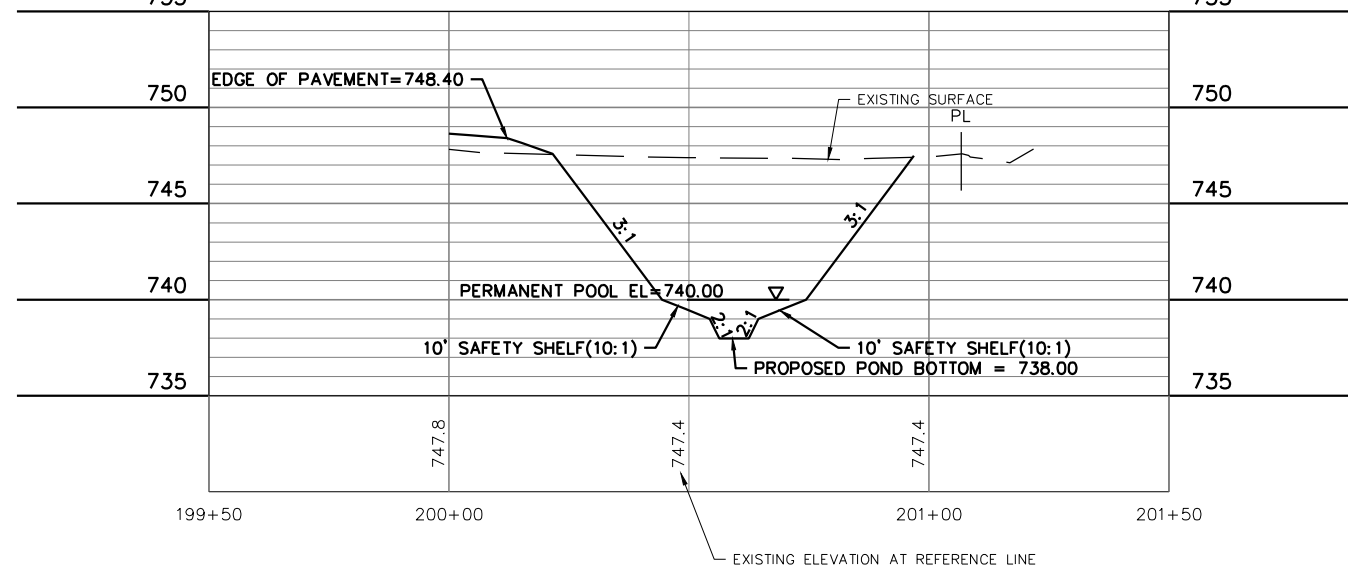
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### SECTION A-A PROFILE



### SECTION B-B PROFILE



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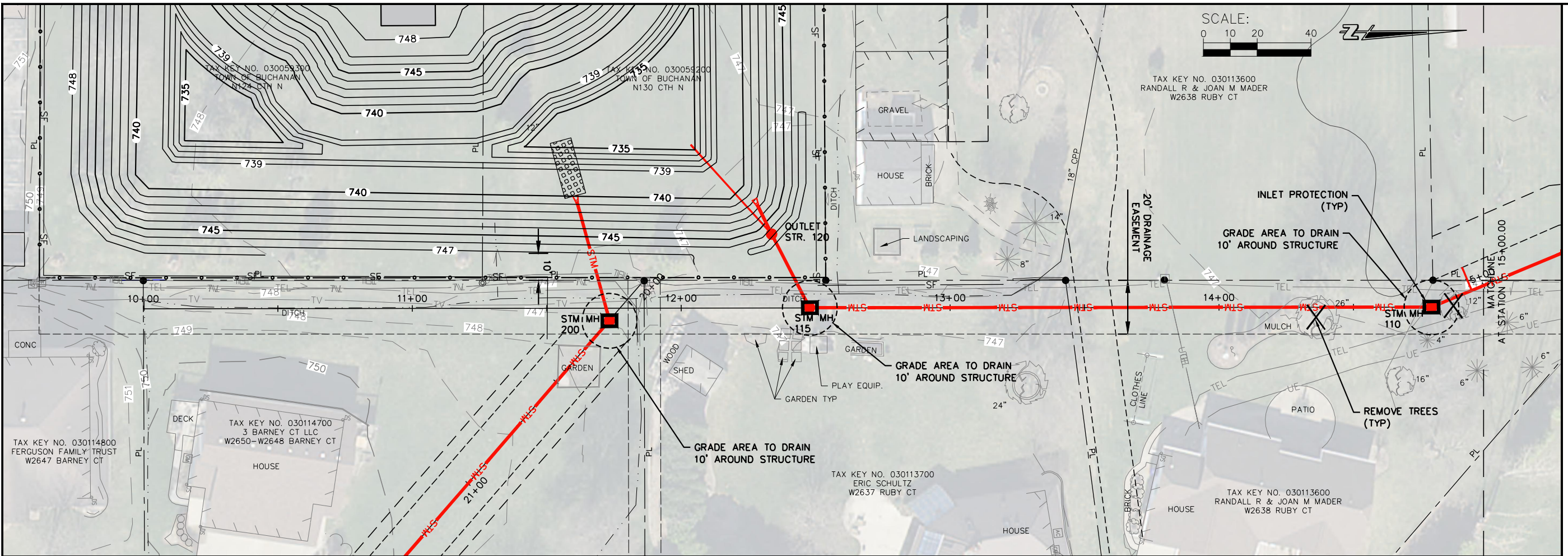
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TOWN OF BUCHANAN  
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YARD WASTE AND POND CROSS SECTIONS

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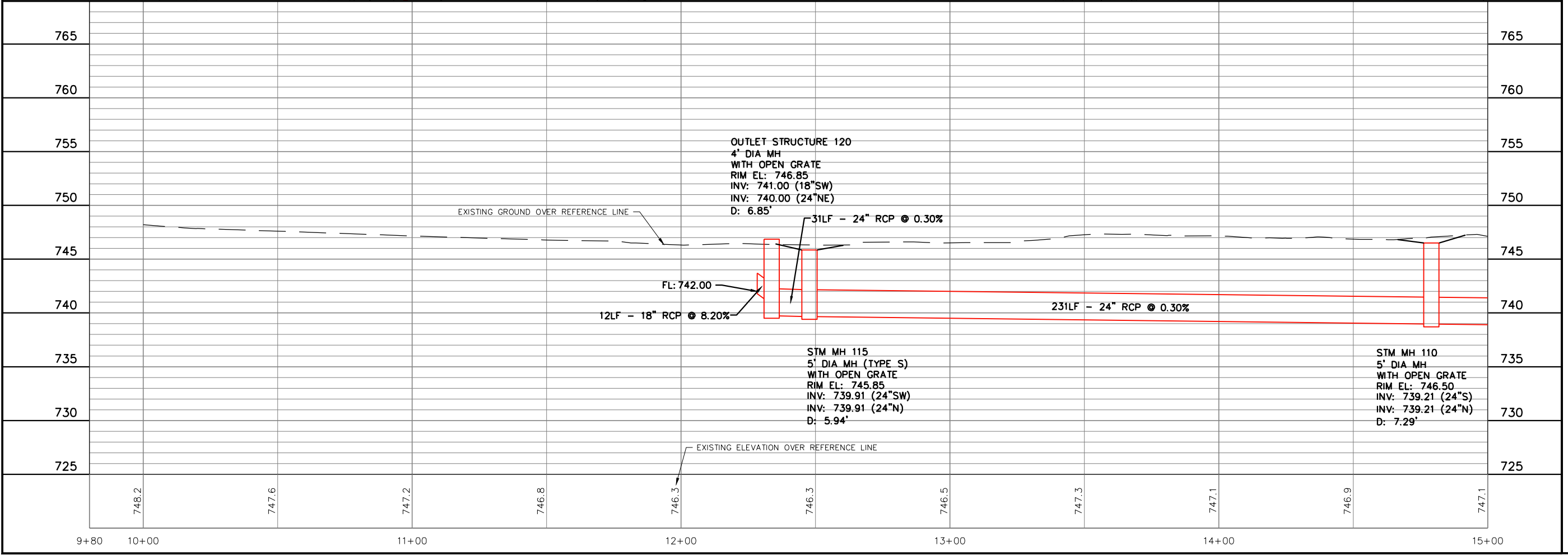
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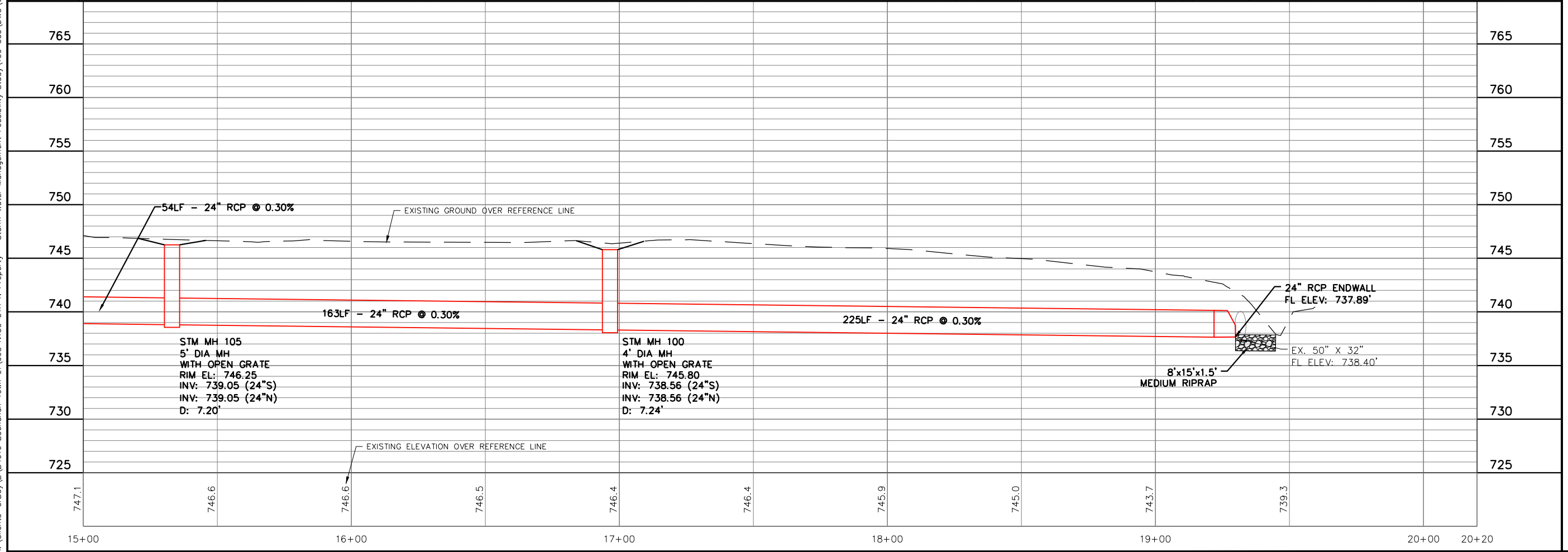
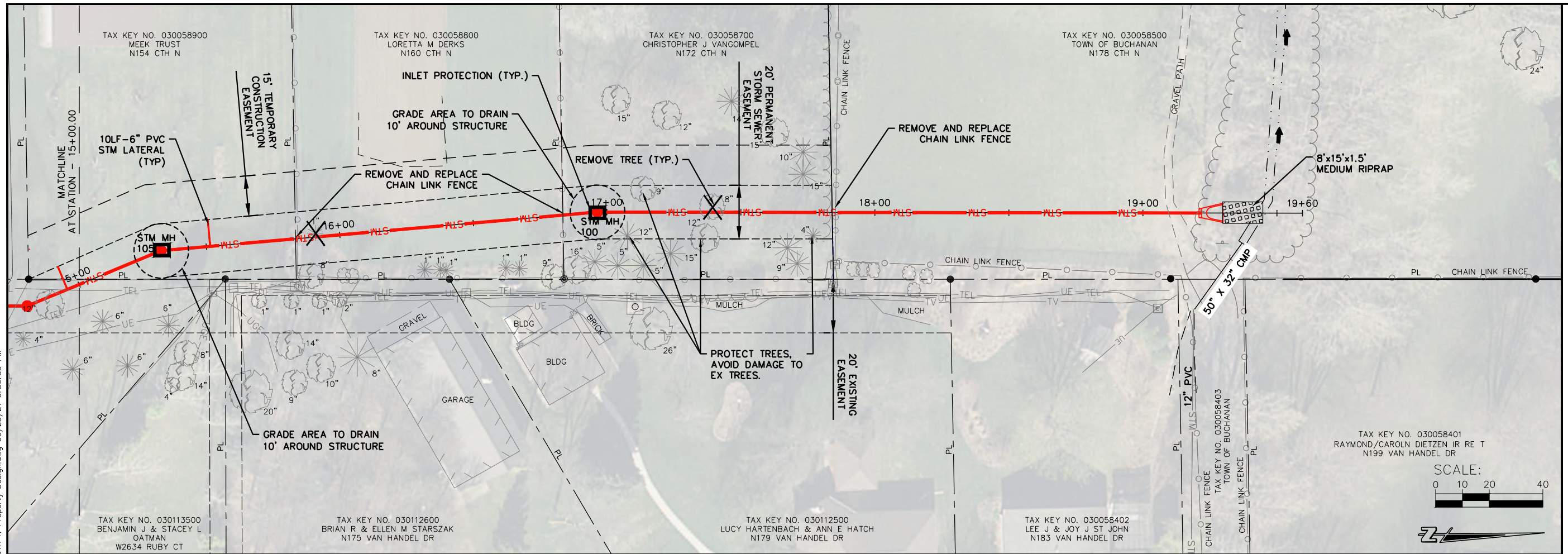
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**TOWN OF BUCHANAN**  
N130 CTH N PROPERTY - STORM WATER MANAGEMENT  
CONTRACT NO. B-21  
STORM SEWER OUTFALL

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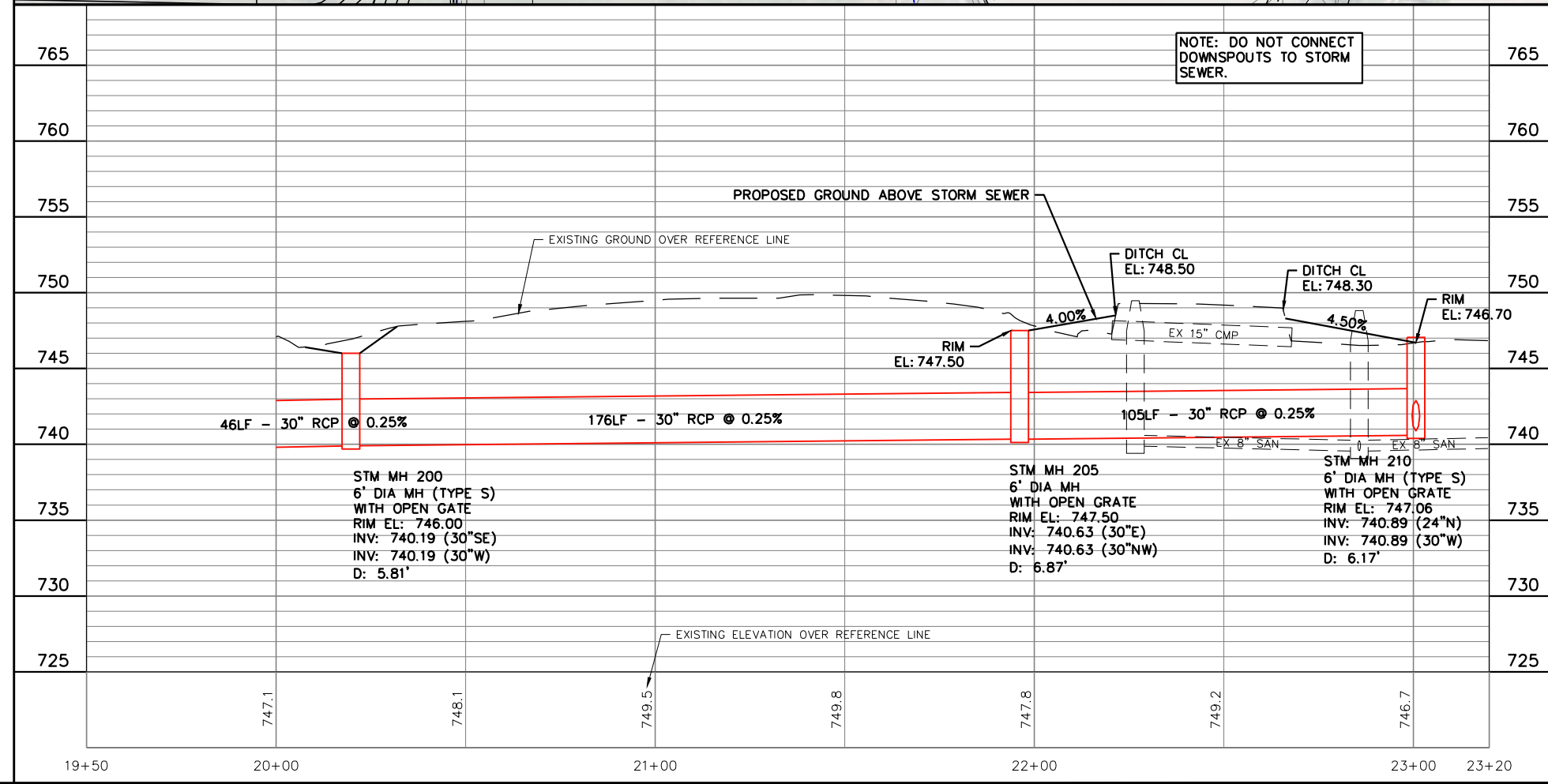
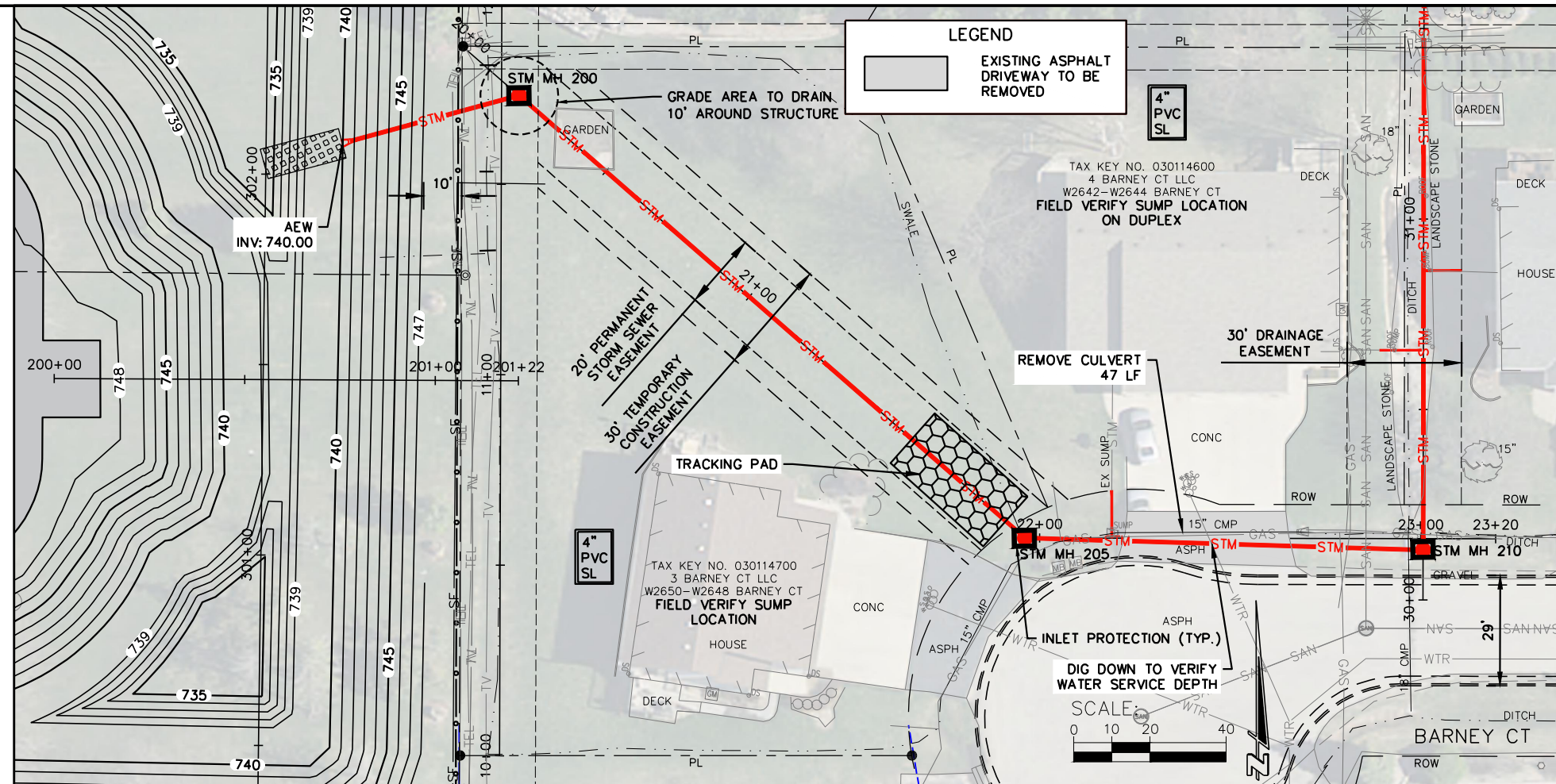
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TOWN OF BUCHANAN  
N130 CTH N PROPERTY - STORM WATER MANAGEMENT  
CONTRACT NO. B-21  
STORM SEWER OUTFALL



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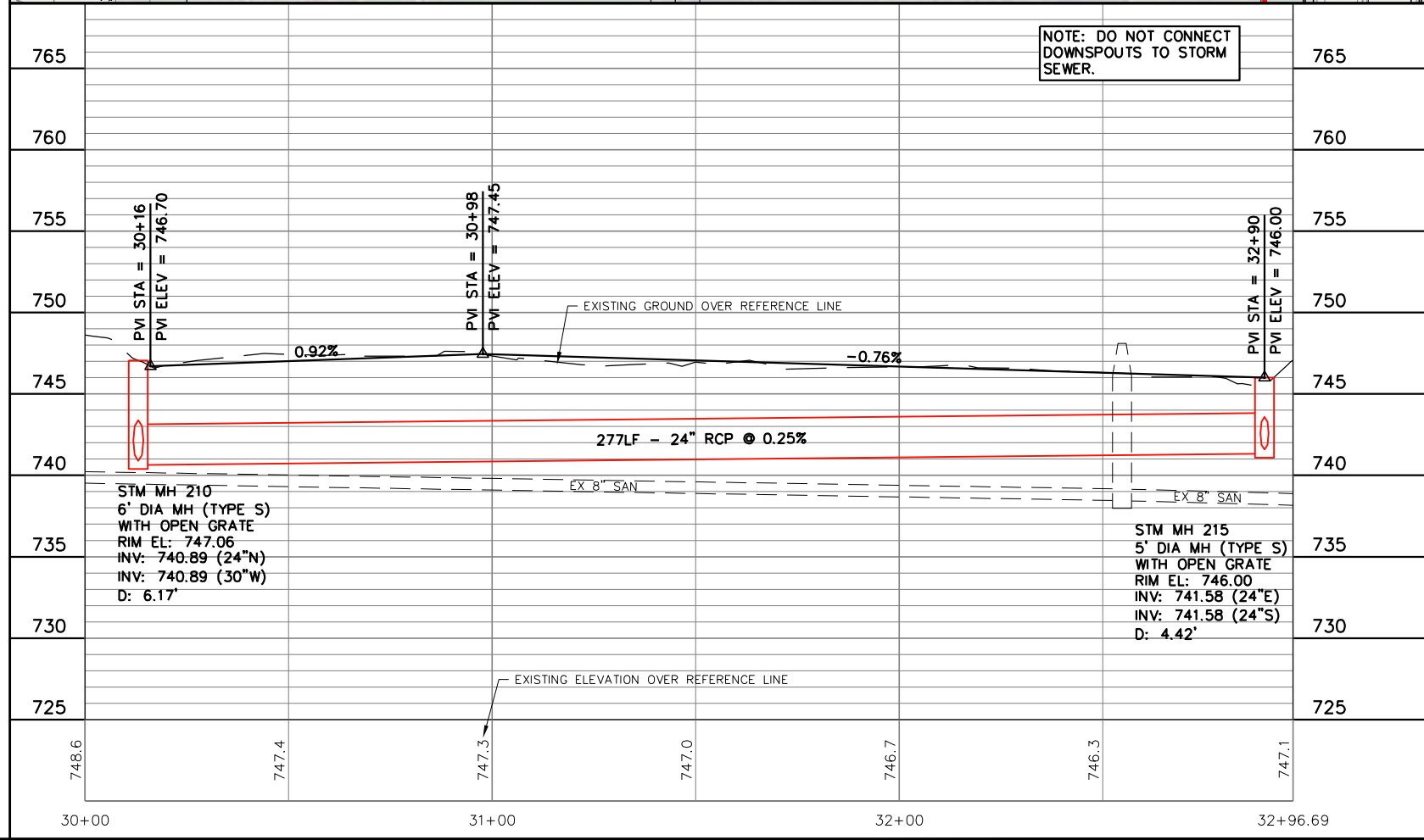
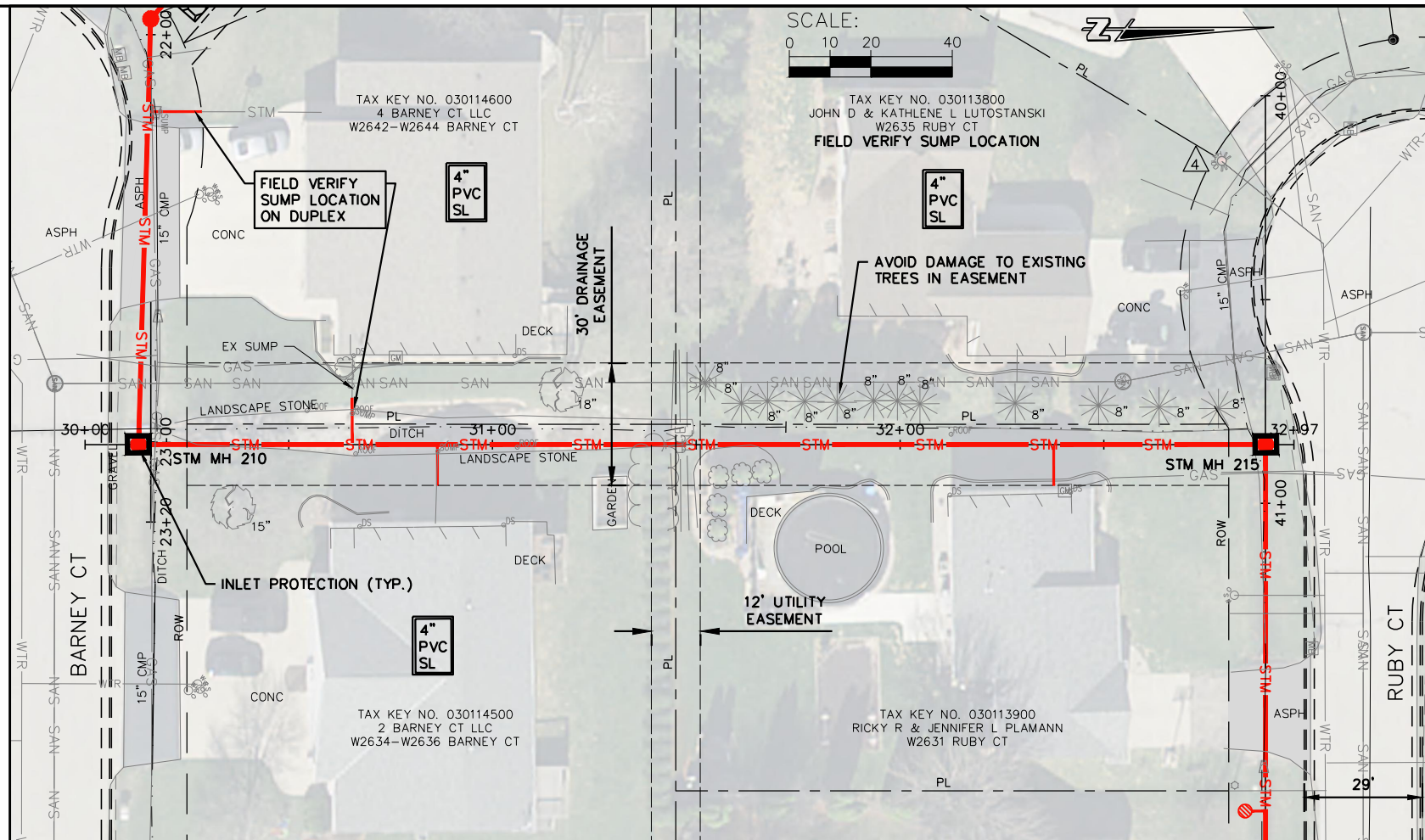
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CONTRACT NO. B-21  
BARNEY COURT STORM SEWER EASEMENTS

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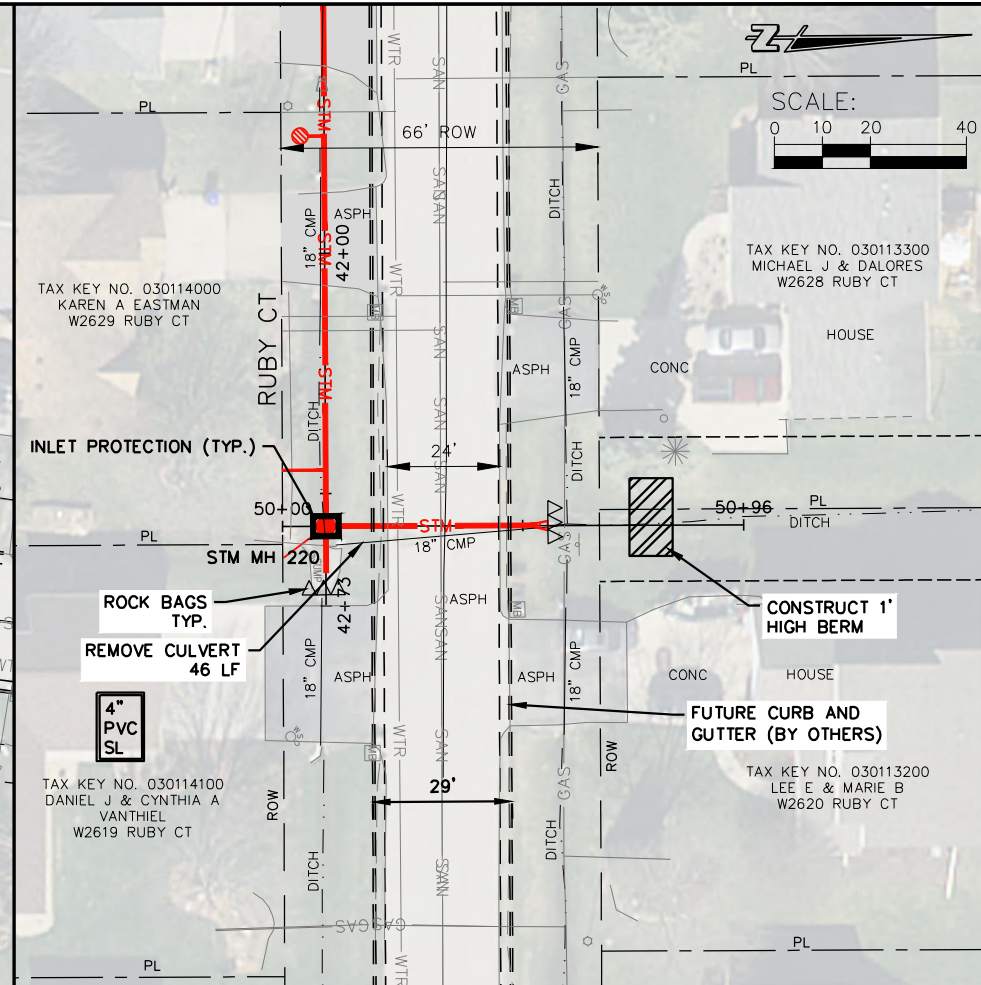
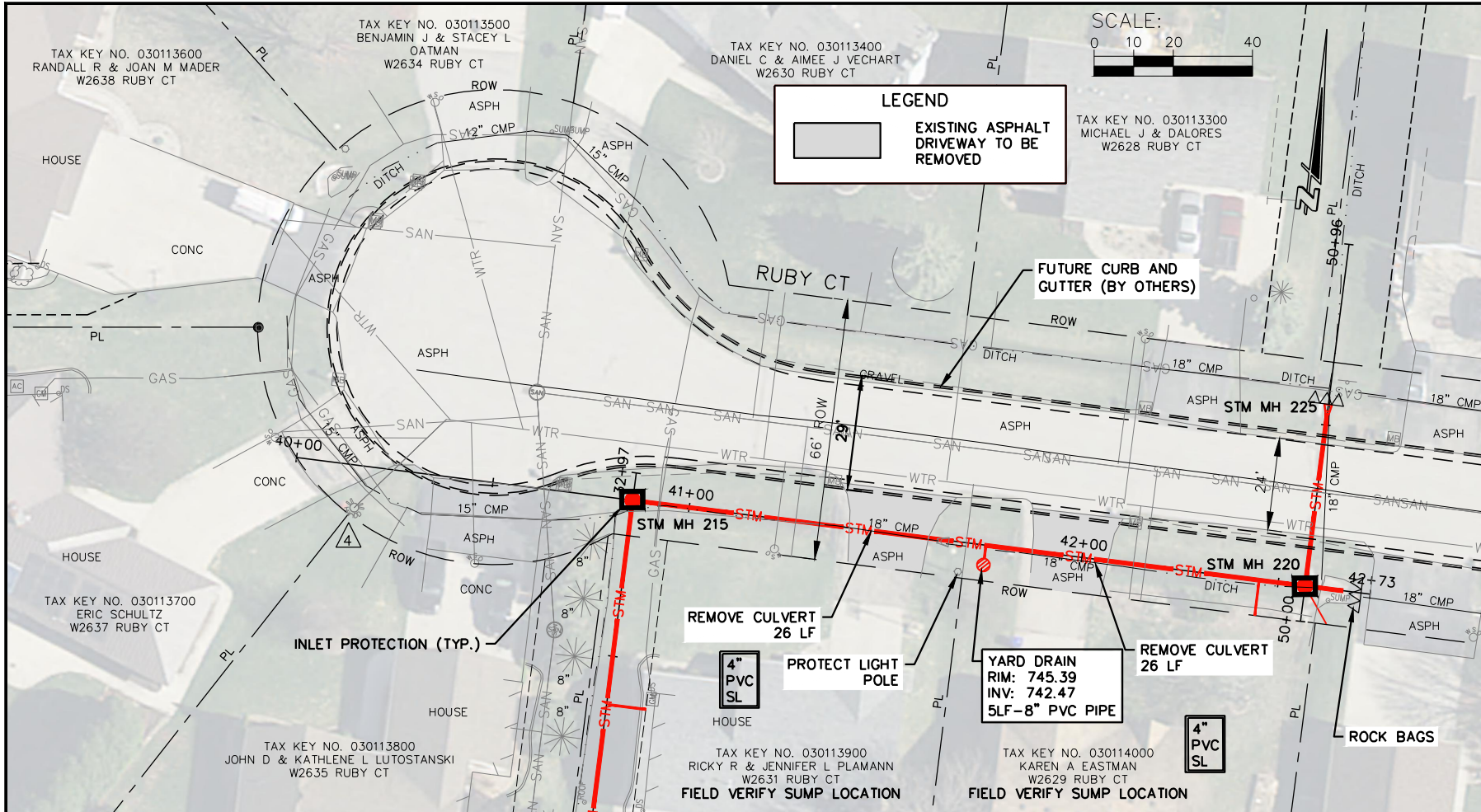
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760																			
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750																			
745																			
740																			
735																			
730																			
725																			
	39+50	40+00	41+00	42+00	42+80	49+75	50+00	51+00	51+25										

NOTE: DO NOT CONNECT DOWNSPOUTS TO STORM SEWER.

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RUBY COURT STORM SEWER EASEMENT

**NOTES:**

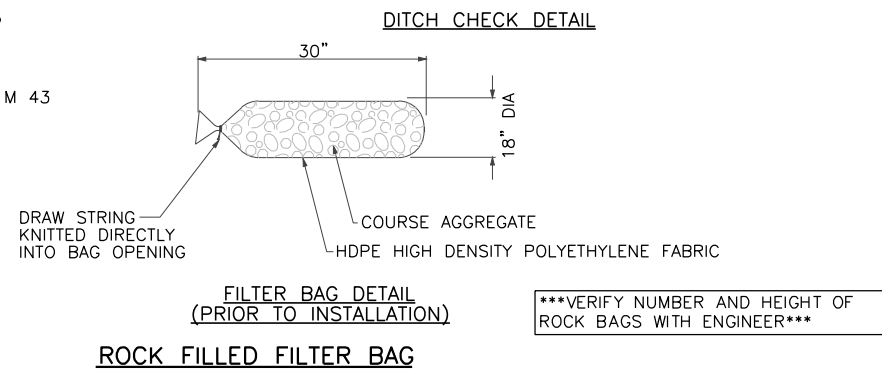
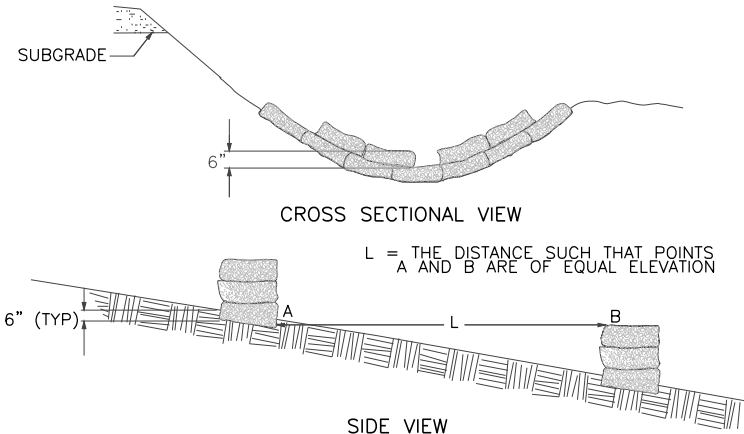
18" X 30" ROCK FILLED FILTER BAG SHALL BE COMPRISED OF THE FOLLOWING:  
 -HDPE HIGH DENSITY POLYETHYLENE  
 -HDPE HIGH DENSITY POLYETHYLENE DRAW STRING KNITTED DIRECTLY INTO BAG OPENING  
 -80% FABRIC CLOSURE WITH APPARENT OPENING SIZE NO LARGER THAN \*" X \*"  
 -ROLLED SEAM USING A MINIMUM OF 480 DENIER POLYESTER SEWING YARN FOR STRENGTH AND DURABILITY.

USE WELL GRADED COURSE AGGREGATE CONFORMING TO THE FOLLOWING GRADATION REQUIREMENTS

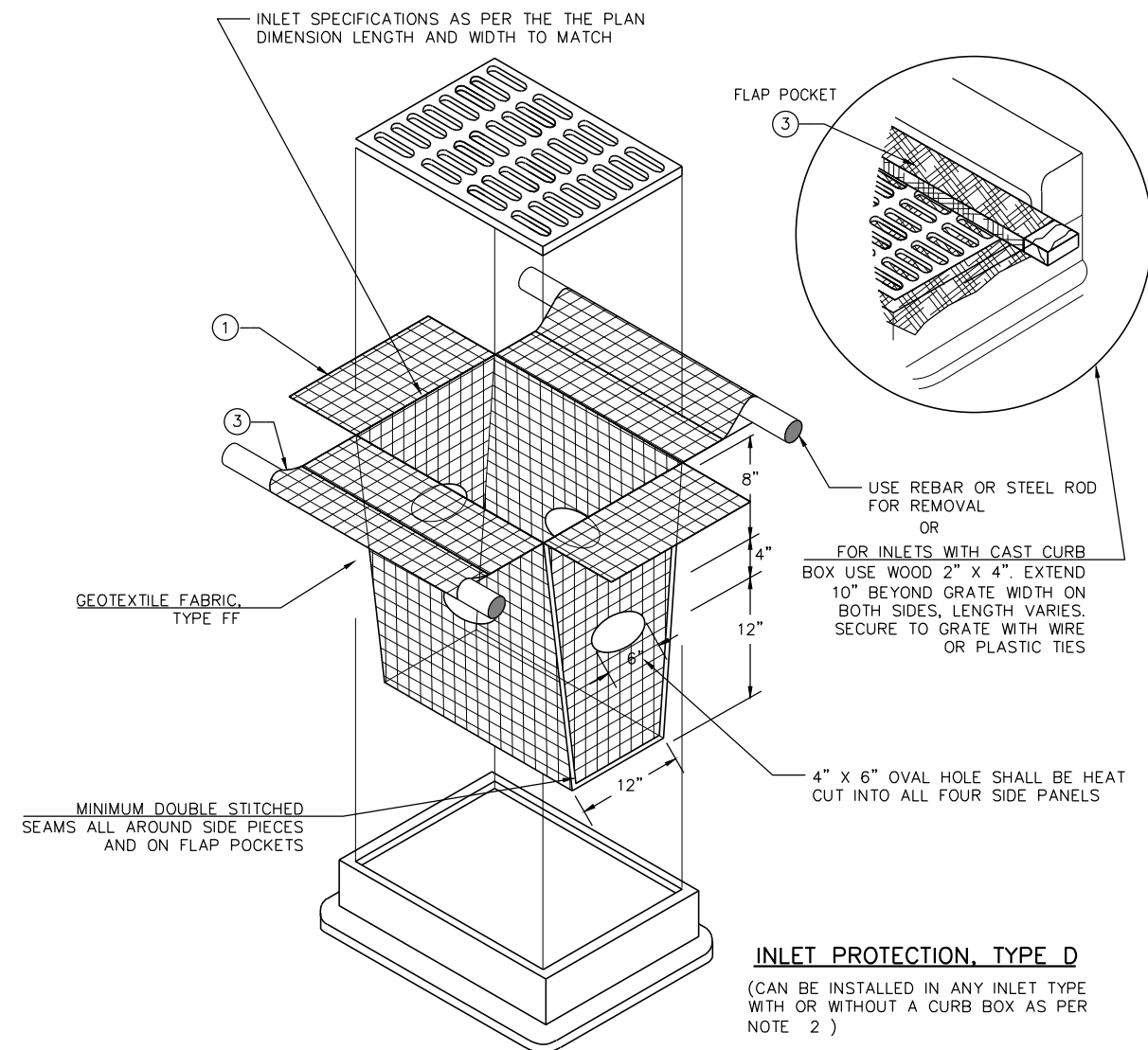
SIEVE SIZE	SIZE NO. AASHTO No. 67
2 INCH (50 mm)	-
1 1/2 INCH (37.5mm)	-
1 INCH (25.0 mm)	100
3/4 INCH (19.0mm)	90-100
3/8 INCH (9.5mm)	20-55
No. 4 (4.75mm)	0-10
No. 8 (2.36mm)	0-5

(1) SIZE No. ACCORDING TO AASHTO M 43

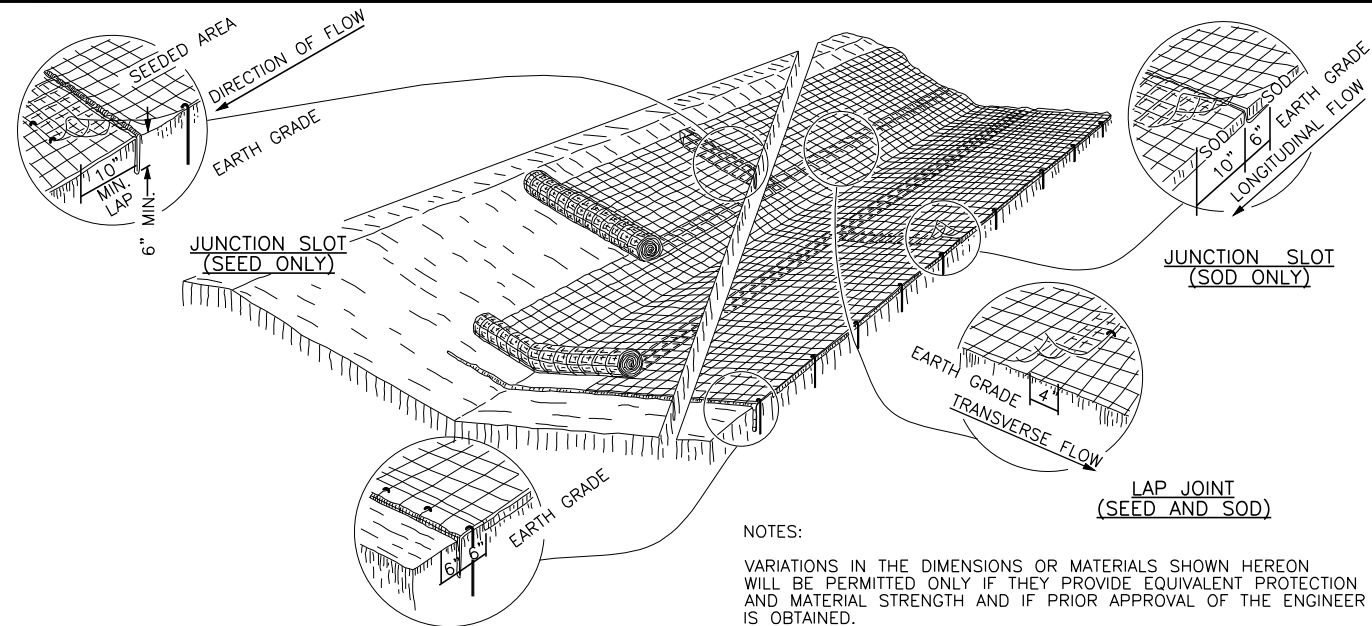
**COURSE AGGREGATE INFORMATION**



**ROCK FILLED FILTER BAG**



**INLET PROTECTION, TYPE D**  
 (CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE 2 )



**NOTES:**

VARIATIONS IN THE DIMENSIONS OR MATERIALS SHOWN HEREON WILL BE PERMITTED ONLY IF THEY PROVIDE EQUIVALENT PROTECTION AND MATERIAL STRENGTH AND IF PRIOR APPROVAL OF THE ENGINEER IS OBTAINED.

DO NOT PLACE LAP JOINTS AT THE BOTTOM OF V-SHAPED DITCHES.

JUNCTION SLOTS ON ADJACENT STRIPS OF MATTING WILL BE STAGGERED A MINIMUM OF 4 FEET APART

IMPRESS ALL EDGES OF THE EROSION MAT INTO THE SOIL.

**EROSION MAT OVER SOD**

ONLY JUTE FABRIC WILL BE PERMITTED OVER SOD

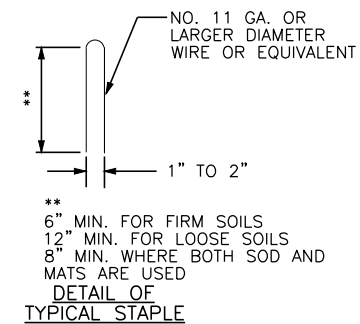
WOOD STAKES FOR SOD MAY BE OMITTED IF THE EXISTING SLOPE AND SOIL CONDITIONS SO WARRANT.

THE WIDTH OF THE EROSION MAT SHALL EQUAL THE SOD WIDTH.

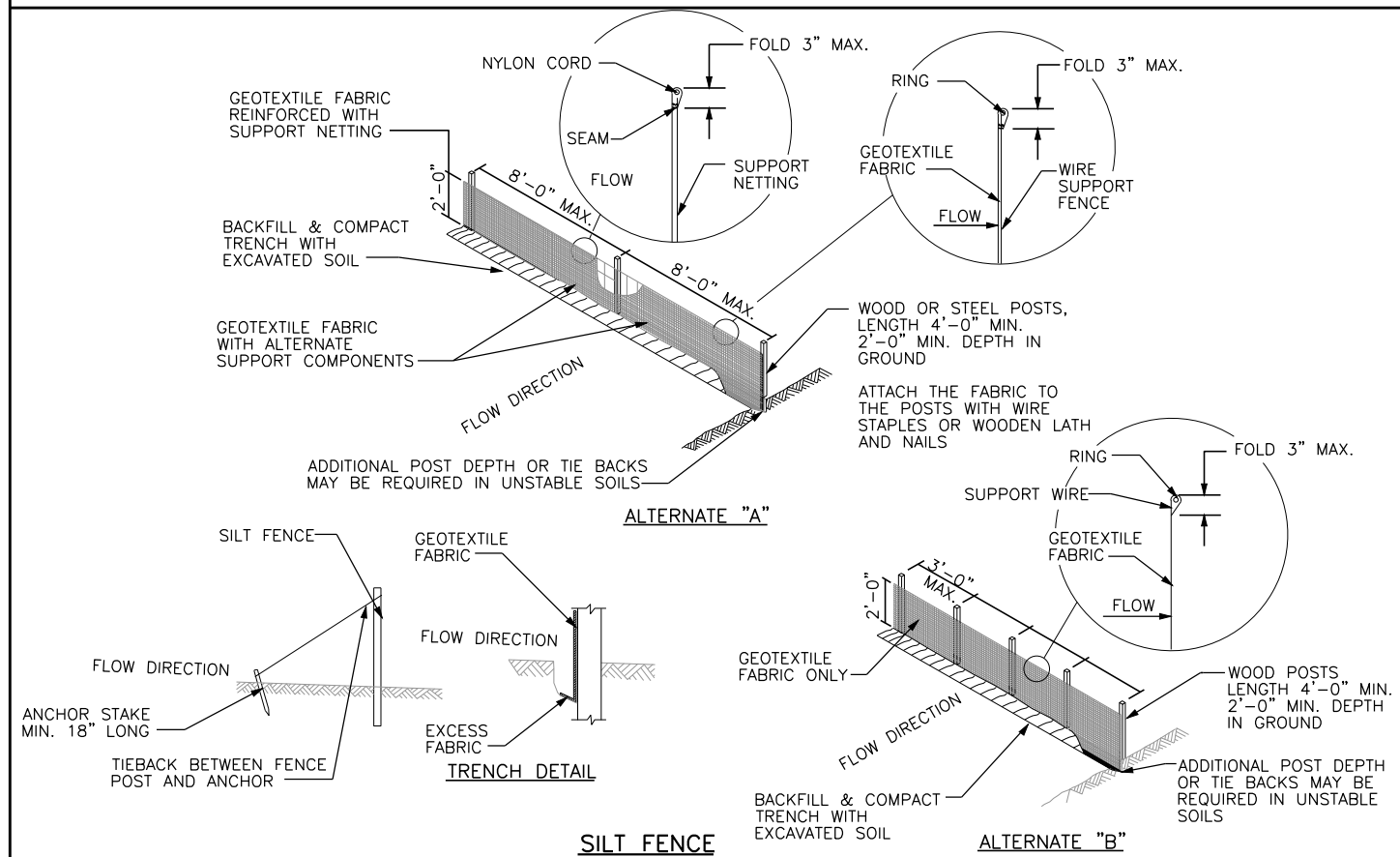
SOD STRIPS MAY BE PLACED EITHER LONGITUDINALLY OR TRANSVERSELY TO THE FLOW LINE OF THE DITCH.

**EROSION MAT OVER SEEDING**

JUNCTION OR ANCHOR SLOTS WILL BE AT MINIMUM INTERVALS OF 100 FEET ON GRADES UP TO AND INCLUDING 3 PERCENT, AND 50 FEET ON GRADES EXCEEDING 3 PERCENT.



**EROSION MAT**



**SILT FENCE**

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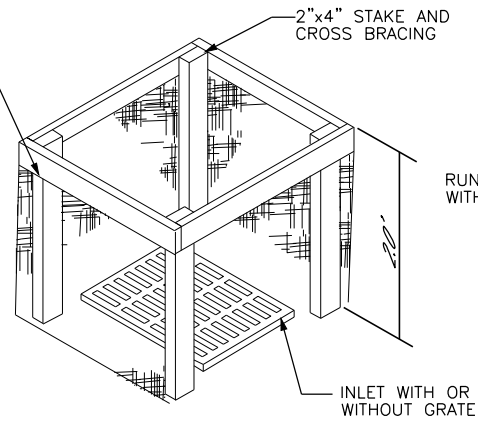
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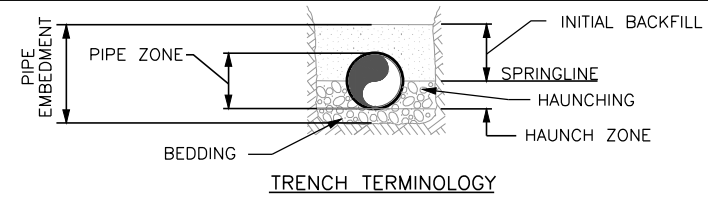
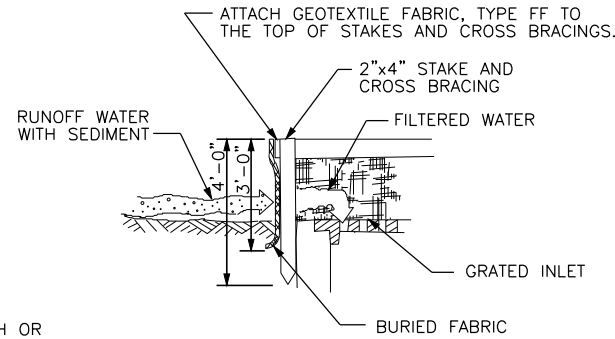
ATTACH GEOTEXTILE FABRIC, TYPE FF TO THE TOP OF STAKES AND CROSS BRACINGS



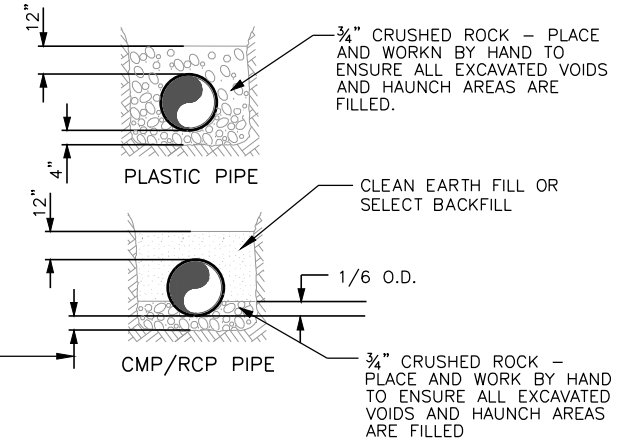
**INLET PROTECTION, TYPE A**

**NOTE:**

WHEN REMOVING OR MAINTAINING INLET PROTECTION, TAKE CARE SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. REMOVE ANY MATERIAL FALLING INTO THE INLET IMMEDIATELY.



**TRENCH TERMINOLOGY**



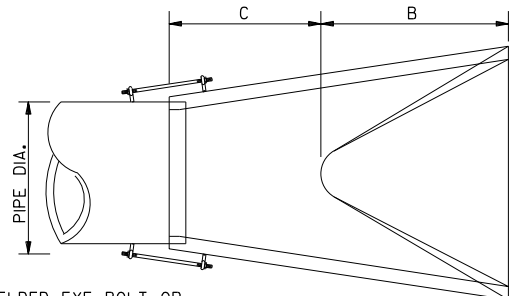
4" OR 1/8 OF O.D. OF PIPE, WHICHEVER IS GREATER

**GENERAL NOTES:**

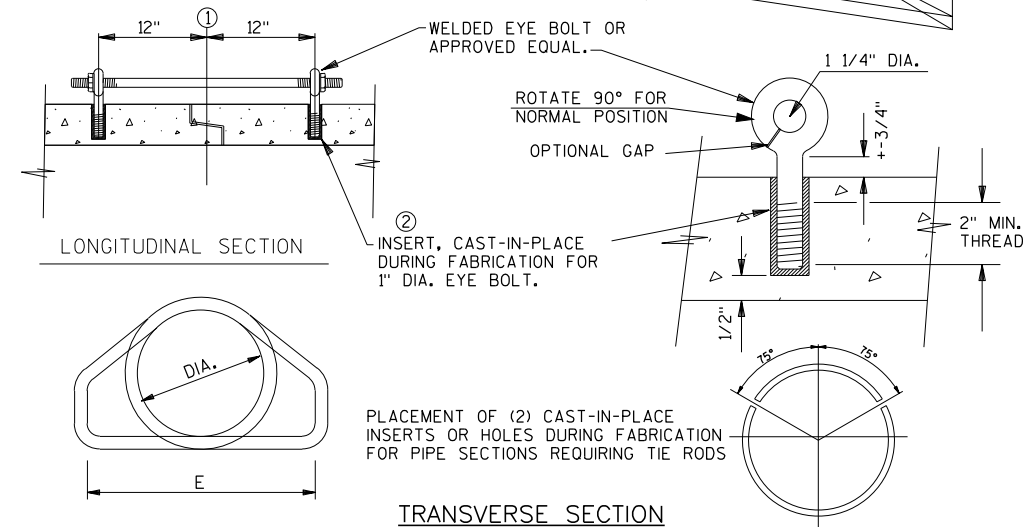
- CLEAN EARTH FILL SHALL BE ANY SOIL MATERIAL EXCAVATED ON THE PROJECT SITE OR OBTAINED FROM BORROW AREAS.
- SELECT BACKFILL SHALL BE USED AS NOTED ELSEWHERE IN THE DRAWINGS.
- SOIL MATERIALS UNSUITABLE AND, THEREFORE, NOT APPROVED FOR THIS CLASSIFICATION ARE:
  - SOILS WITH HIGH ORGANIC CONTENTS SUCH AS: TOPSOIL, PEAT, MUCH, ORGANIC SILTS, AND CLAYS, MARLS, ETC.
  - MANMADE OR RUBBLE FILLED SOILS CONTAINING SUCH MATERIALS AS: FOUNDRY SAND, FLY ASH CINDERS, ASPHALT, AND CONCRETE RUBBLE, ETC.
  - SILTY SOILS SUCH AS: ROCK FOUR, LOESS, ETC.
  - SOILS WITH GRAVEL LARGER THAN 1 1/2 INCH
  - SILTY CLAY OR CLAYS WITH A HIGH PLASTICITY (CH SOILS AS DEFINED IN ASTM D2487).
  - ALL SOIL CONTAMINATED WITH HAZARDOUS WASTE MATERIALS AS DEFINED BY THE EPA.

**PIPE EMBEDMENT DETAILS**

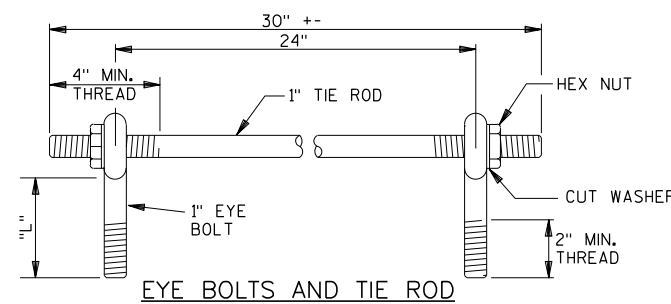
- GENERAL NOTES:**
- JOINT SHALL MATCH JOINT OF ENTERING PIPELINE
  - CLEAN THE INSIDE OF THE THREADED INSERTS TO ALLOW THE INSERTION OF THREADED EYE BOLTS.
  - PLACE OR DRILLED 12" FROM CENTER OF TONGUE AND GROVE.
  - PROVIDE TIE RODS ON END SECTIONS AND 3 PIPE SECTIONS



**PLAN AND SECTIONS**



**TRANSVERSE SECTION**



**EYE BOLTS AND TIE ROD**

**RCP APRON ENDWALL DETAIL**

DIA.	A	B	C	D	E	SLOPE
12"	4"	2'-0"	4'-7/8"	6'-7/8"	2'-0"	3:1
15"	6"	2'-3"	3'-10"	6'-1"	2'-6"	3:1
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"	3:1
21"	9"	3'-0"	3'-1 1/2"	6'-1 1/2"	3'-6"	3:1
24"	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	3:1
27"	10 1/2"	4'-1 1/2"	2'-0"	6'-1 1/2"	4'-6"	3:1
30"	12"	4'-6"	1'-7 3/4"	6'-1 1/2"	5'-0"	3:1
36"	15"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	3:1
42"	21"	5'-3"	2'-11"	8'-2"	6'-6"	3:1
48"	24"	6'-0"	2'-2"	8'-2"	7'-0"	3:1
54"	27"	5'-5"	2'-9 1/4"	8'-2 1/4"	7'-6"	2 2/5:1
60"	30"	5'-0"	3'-3"	8'-3"	8'-0"	2:1

**GENERAL DIMENSIONS**

PIPE SIZE	L = LENGTH	
	TONGUE & GROOVE PIPE	MODIFIED BELL PIPE
18" TO 24"	4 1/2"	6 1/4"
30"	5"	7"
36"	5 1/2"	7"
42"	6"	
48"	6 1/2"	
60"	7 1/2"	
66"	8"	

**EYE BOLT DIMENSION TABLE**

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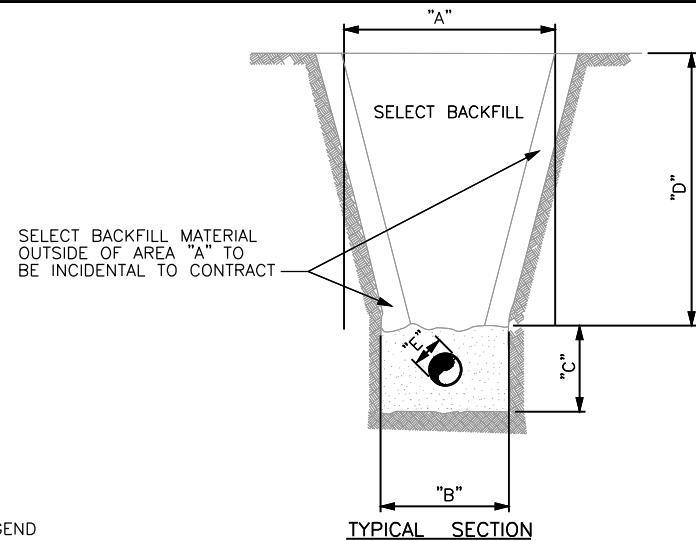
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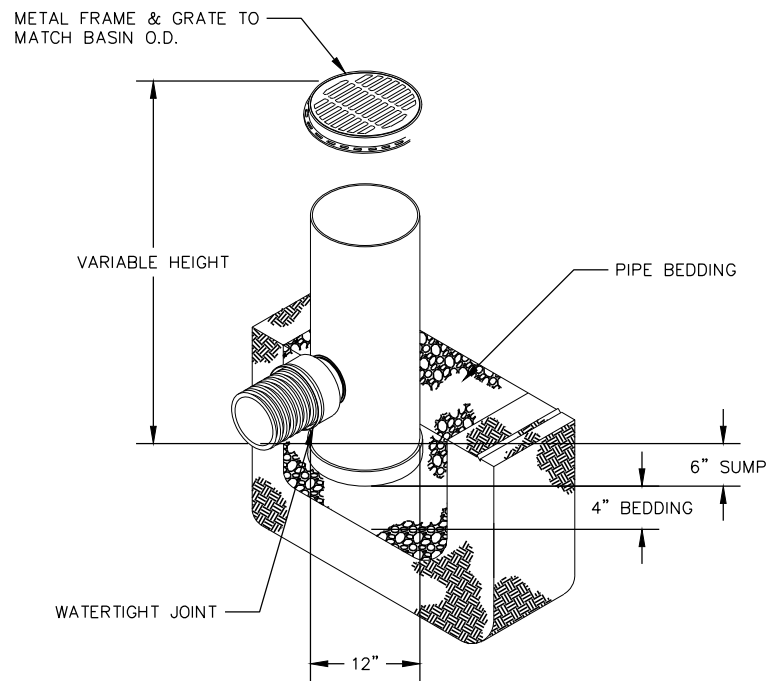
**LEGEND**

- "A" - THEORETICAL TRENCH WIDTH FOR CALCULATING SELECT BACKFILL FOR PAYMENT:
- "A" WILL BE PIPE OUTSIDE DIAMETER PLUS 24 INCHES OR EQUAL TO "D", WHICHEVER NUMBER IS GREATER.
- "B" - WIDTH TO ONE FOOT ABOVE THE TOP OF PIPE, OUTSIDE DIAMETER PLUS 24 INCHES (MAXIMUM)
- "C" - BEDDING AND COVER MATERIAL (INCIDENTAL TO PIPE INSTALLATION)
- "D" - TRENCH DEPTH
- "E" - OUTSIDE DIAMETER OF PIPE

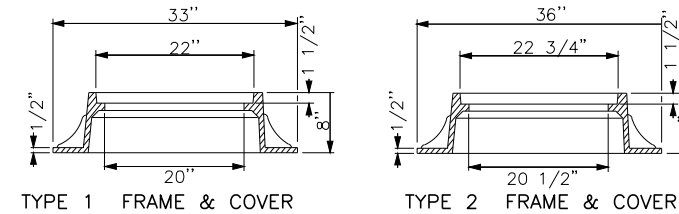
**NOTES:**

THIS DETAIL IS NOT A RESTRICTION OF ACTUAL TOP OF TRENCH, BUT IS USED TO DETERMINE THE QUANTITY OF SELECT BACKFILL MATERIAL.  
 BACKFILL OUTSIDE LIMITS SHOWN WILL BE INCIDENTAL TO PIPE INSTALLATION.

**SELECT BACKFILL COMPUTATION DETAIL**

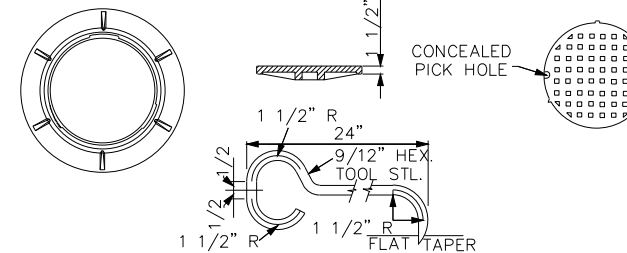


**PVC YARD DRAIN**  
NO SCALE



TYPE 1 FRAME & COVER  
MINIMUM WT. 285 LBS.  
NEENAH R-1500 OR EQUAL

TYPE 2 FRAME & COVER  
MINIMUM WT. 280 LBS  
NEENAH R-1689 OR EQUAL

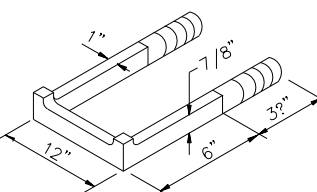
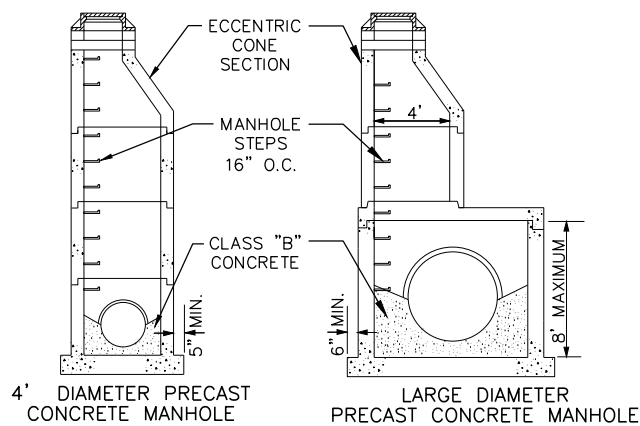


**COVER REMOVING TOOL**  
FOR CONCEALED PICKHOLE

**NOTES:**

- ALL COVERS SHALL BE SELF-SEALING WITH GASKET.
- FRAME AND COVER SHALL BE MACHINED AND FITTED SO THAT ROCKING AND CHATTERING WILL BE ELIMINATED.
- WHEN MANHOLE ADJUSTMENT IS LIMITED, PROVIDE TYPE 2 FRAME
- FRAME WEIGHT INCLUDES COVER
- FURNISH ONE COVER REMOVING TOOL FOR CONCEALED PICKHOLE COVERS WITH EACH ORDER OF 20 COVERS OR FRACTION THERE OF.

**FRAME & COVER DETAIL**



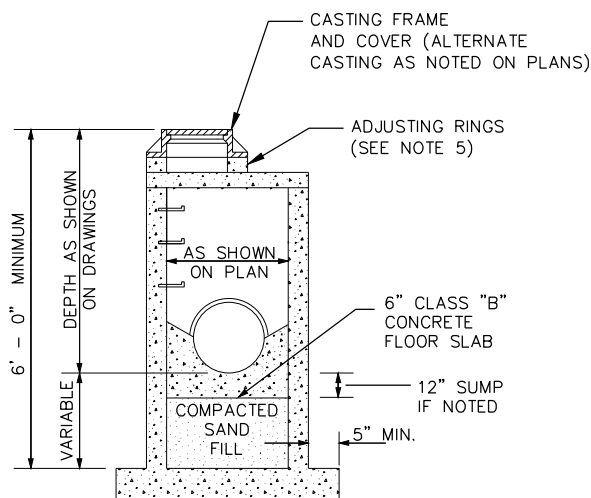
**TYPICAL MANHOLE STEP**

**NOTES:**

BASE SLAB OVERHANG DESIGNED FOR 25" MAXIMUM DEPTH  
 PRECAST CONCRETE BASE SHALL BE CAST MONOLITHIC WITH BARREL SECTION

	MAX. PIPE I.D. STRAIGHT THRU TO 45° DEFLECTION	MAX. PIPE I.D. 90° DEFLECTION
4' MANHOLE	18"	18"
5' MANHOLE	30"	27"
6' MANHOLE	42"	30"
8' MANHOLE	54"	42"
9' MANHOLE	66"	54"

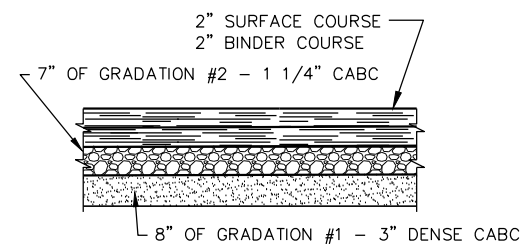
**STRUCTURE: PRECAST MANHOLE DETAIL**



**NOTES:**

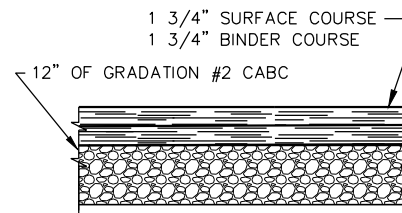
1. BASE SHALL BE CAST MONOLITHIC WITH BARREL SECTION
2. PIPE SHALL ENTER BARREL THROUGH A FLEXIBLE WATERTIGHT GASKET CONFORMING TO ASTM C443 OR C923
3. BARREL SECTION SHALL BE ONE PIECE
4. USE THIS MANHOLE ON ANY GRAVITY SEWER LINES LESS THAN SIX FEET DEEP
5. THE FINAL ADJUSTMENT RING TO BE A 2" RECYCLED RUBBER RING FOR MANHOLES WITHIN THE ROAD SECTION.
6. USE CASTING NEENAH INLET CASTING R-3501-P WHERE NOTED ON PLANS.

**TYPE "S" MANHOLE DETAIL**

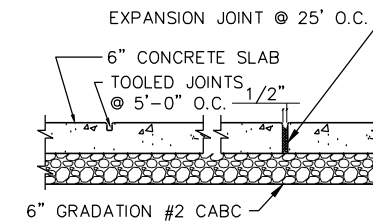


**YARD WASTE ASPHALT PAVEMENT TYPICAL SECTION**

NOTE: 1" OF BASE COURSE REQUIRED OUTSIDE ASPHALT PAVEMENT LIMITS

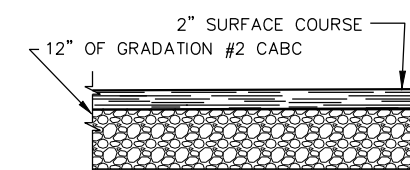


**RUBY COURT ASPHALT PATCHING TYPICAL SECTION**



NOTE: USE 1/2" FELT JOINT WHERE CONCRETE MEETS BUILDING

**6" CONC. DRIVEWAY**



**RESIDENTIAL ASPHALT DRIVEWAY TYPICAL SECTION**

NOTE: CURB BOXES LOCATED IN CONCRETE DRIVEWAYS OR PAVEMENT SHALL BE ENCASED INSIDE OF A 4" PVC SLEEVE.

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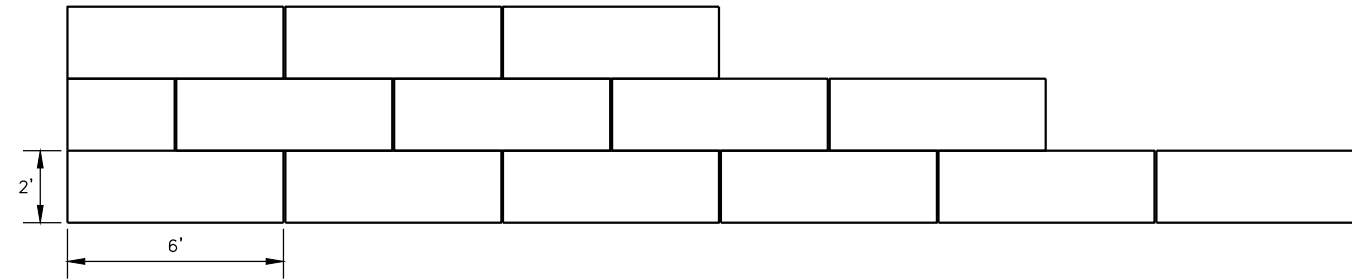
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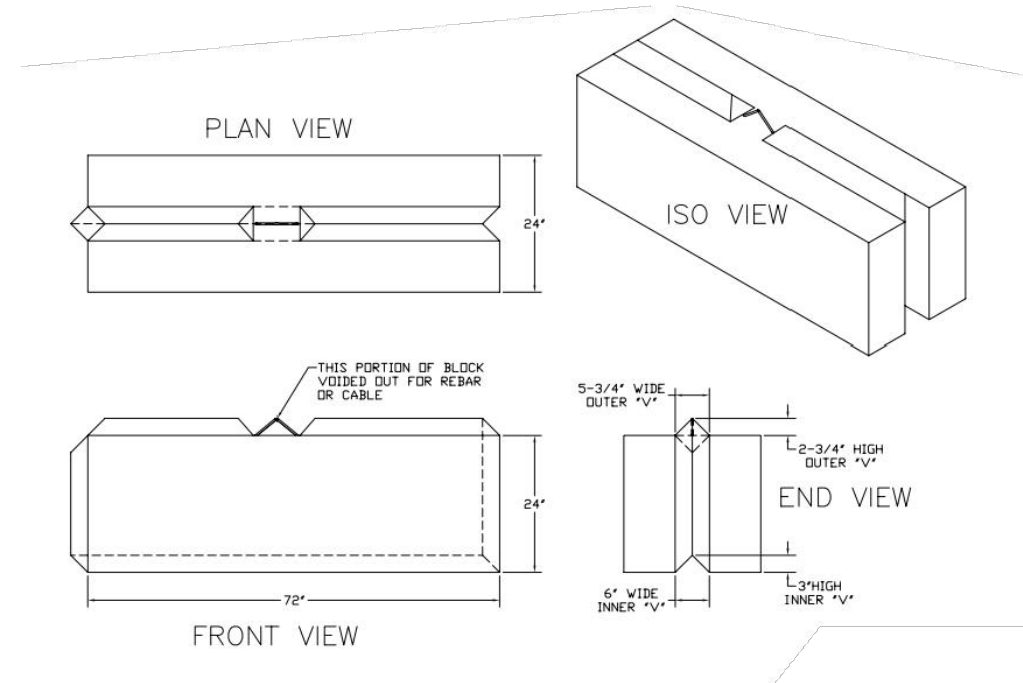
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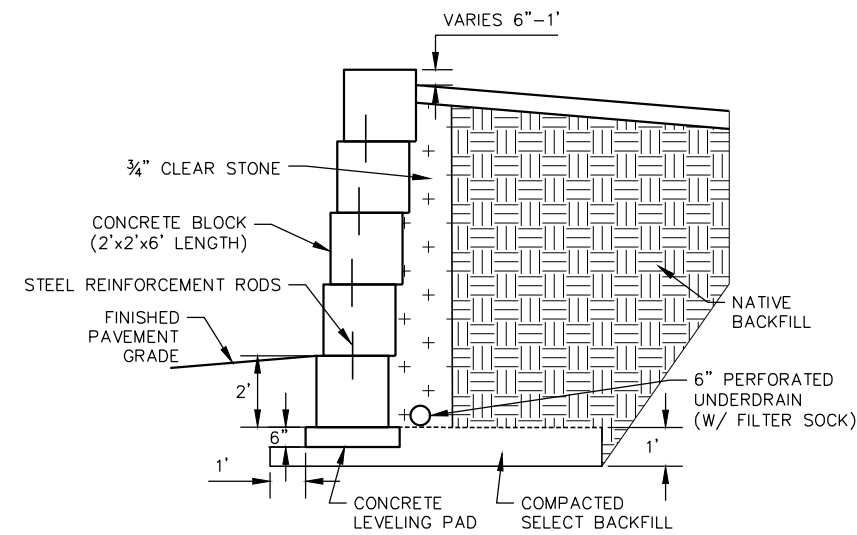
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CONCRETE BLOCK RETAINING WALL - SIDE VIEW



6' CONCRETE BLOCK



CONCRETE BLOCK RETAINING WALL  
\* FRONT FACE WALL OF CONCRETE BLOCKS TO BE STAGGERED.

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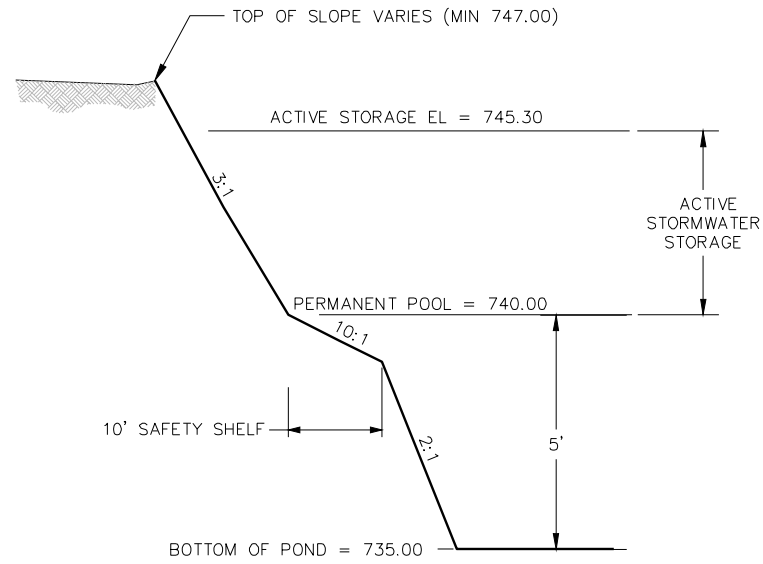
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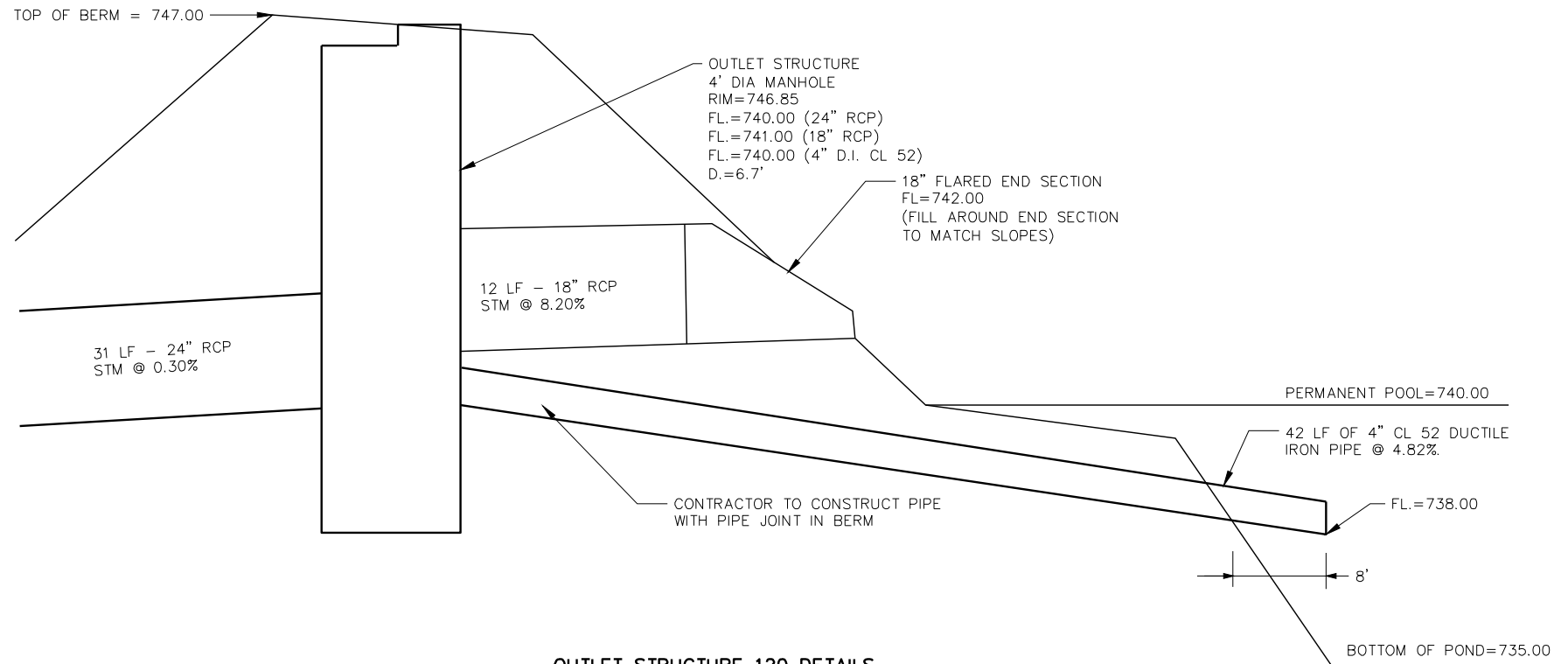
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TOWN OF BUCHANAN  
N130 CTH N PROPERTY - STORM WATER MANAGEMENT  
CONTRACT NO. B-21  
STANDARD DETAILS

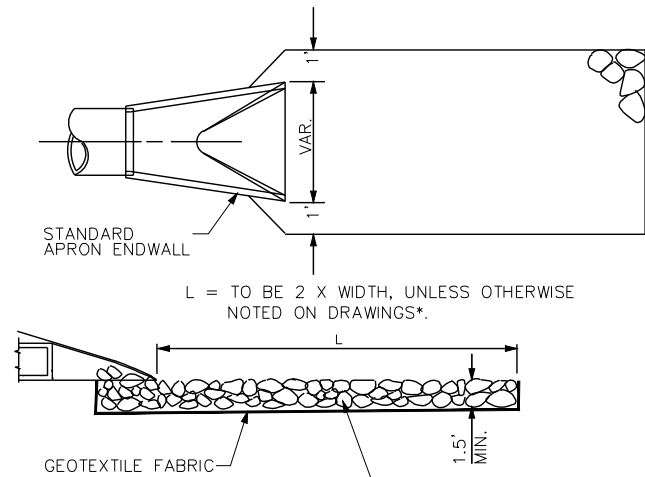
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**WET DETENTION POND**

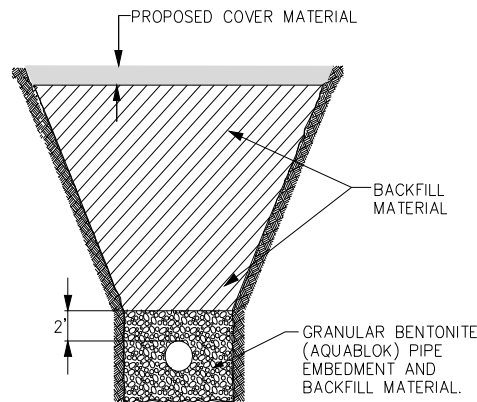


**OUTLET STRUCTURE 120 DETAILS**



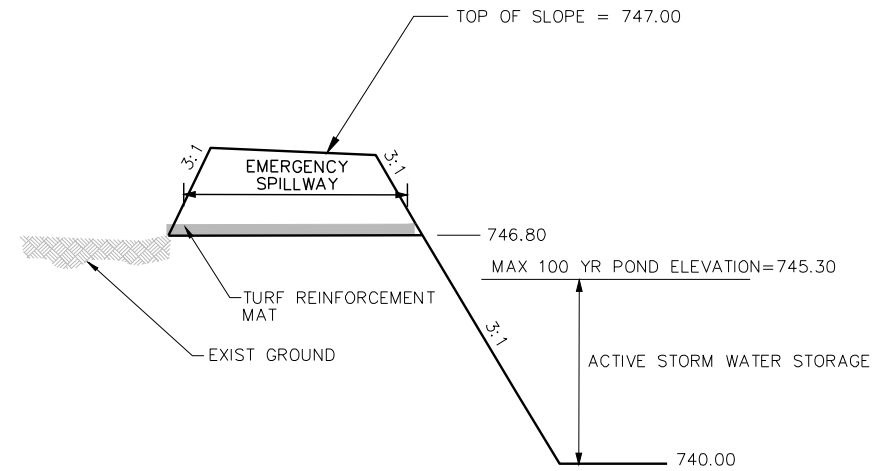
- NOTES:**
1. INLET PIPES TO POND SHALL GET RIP RAP ON SAFETY SHELF AND DOWN SLOPE TO BOTTOM OF POND.
  2. LAST 3 PIPE JOINTS SHALL BE TIED PER SPECIFICATIONS.

**RIPRAP DETAIL**

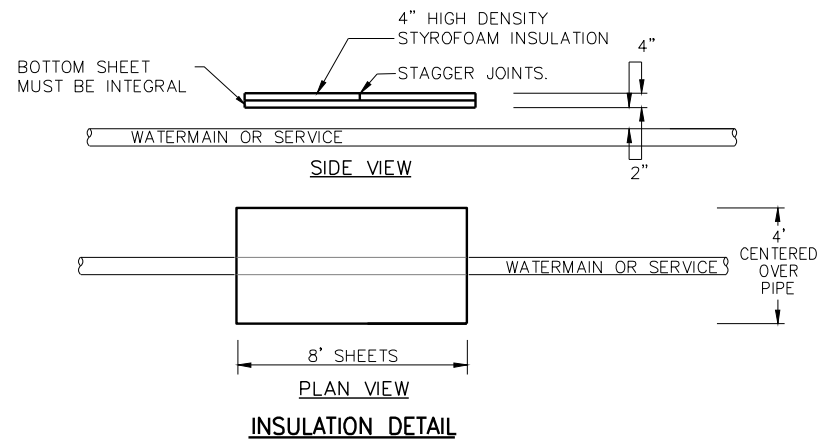


- GENERAL NOTES:**
1. LENGTH ALONG PIPE IS 3 FEET
  2. COMPACT AROUND PIPE TO ELIMINATE VOIDS
  3. MINIMUM 6' WIDE

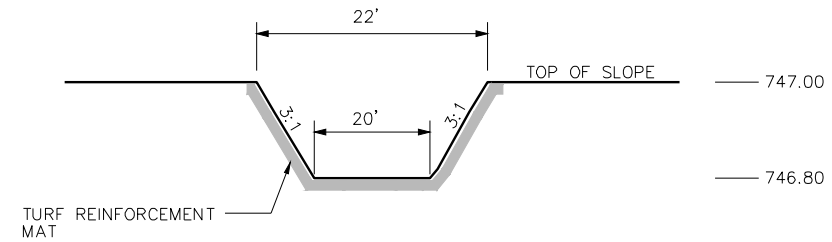
**CLAY DAM**



**EMERGENCY SPILL WAY SECTION**



**INSULATION DETAIL**



**EMERGENCY SPILL WAY DETAIL**

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BOOK NO.
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CHECKED BY JKK
DATE SEPTEMBER 23, 2021
REVISIONS
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DRAWING FILE

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