

CITY OF DE PERE

PROJECT 20-02

STREET RECONSTRUCTION AND UTILITY RELAY

**BID DATE:
FEBRUARY 27, 2020
@ 1:00 PM**

Bid documents, including plans and specifications, are available for download at www.QuestCDN.com. The QuestCDN website can also be accessed through the City website at www.deperewi.gov. On the homepage, click on the *Projects* Icon in the middle of the page. Download cost is \$15 for each contract. Bidding documents may be viewed on the QuestCDN website or at the Municipal Service Center, 925 S. Sixth Street, De Pere, WI 54115.

Bid Tabs must be verified by staff prior to posting and will be available for viewing on the website within 7 days following the bid opening. Award information will be pending until approved by the Common Council.

SECTION 00 01 10

TABLE OF CONTENTS

INTRODUCTORY INFORMATION

<u>Section</u>	<u>Title</u>
00 00 01	PROJECT MANUAL COVER
00 01 10	TABLE OF CONTENTS

PROJECT BID DOCUMENTS

<u>Section</u>	<u>Title</u>
00 11 13	ADVERTISEMENT TO BID
00 21 13	INSTRUCTIONS TO BIDDERS
00 41 13	BID FORM
00 41 43	BID SCHEDULE
00 43 13	BID BOND
00 43 33	PROPOSED PRODUCTS FORM
00 43 36	TABULATION OF SUBCONTRACTOR

CONTRACTING REQUIREMENTS

<u>Section</u>	<u>Title</u>
00 51 00	NOTICE OF AWARD
00 52 13	CONTRACT
00 55 00	NOTICE TO PROCEED
00 61 13	PAYMENT BOND
00 61 16	PERFORMANCE BOND
00 62 76	APPLICATION FOR PAYMENT
00 65 16	CERTIFICATE OF SUBSTANTIAL COMPLETION

DIVISION 1

GENERAL REQUIREMENTS

<u>Section</u>	<u>Title</u>
01 10 00	SUMMARY OF WORK
01 22 01	MEASUREMENT AND PAYMENT SANITARY SEWER
01 22 02	MEASUREMENT AND PAYMENT STORM SEWER
01 22 03	MEASUREMENT AND PAYMENT WATER SYSTEM
01 22 04	MEASUREMENT AND PAYMENT STREET AND DRAINAGE CONSTRUCTION
01 22 05	MEASUREMENT AND PAYMENT SPECIAL CONSTRUCTION
01 22 10	MEASUREMENT AND PAYMENT ELECTRICAL
01 22 11	MEASUREMENT AND PAYMENT LANDSCAPING
01 22 12	MEASUREMENT AND PAYMENT DEMOLITION
01 29 00	PAYMENT PROCEDURES
01 32 33	CONSTRUCTION PHOTOGRAPHS
01 33 00	SUBMITTALS
01 41 00	REGULATORY REQUIREMENTS
01 70 00	CLOSEOUT REQUIREMENTS
01 71 23	FIELD ENGINEERING

SUPPLEMENTAL SPECIAL PROVISIONS

<u>Section</u>	<u>Title</u>
03 31 00	STRUCTURAL CONCRETE
03 35 33	STAMPED COLORED CONCRETE FINISHING
03 35 33.1	COLORED CONCRETE FINISHING
05 52 00.1	STRUCTURAL STEEL RAILINGS
12 93 00	SITE FURNISHINGS
13 12 13	EXTERIOR FOUNTAIN
26 00 00	BASIC ELECTRICAL REQUIREMENTS
26 05 01	ELECTRICAL DEMOLITION AND ALTERATIONS
26 05 02	ELECTRICAL WIRING METHODS
26 05 03	WIRING CONNECTIONS
26 05 19	BUILDING WIRE AND CABLE
26 05 26	GROUNDING AND BONDING
26 05 33	RACEWAY AND BOXES
26 05 53	ELECTRICAL IDENTIFICATION
26 09 43	NETWORKED LIGHTING CONTROLS
26 24 16	PANELBOARDS
26 27 16	CABINETS AND ENCLOSURES
26 27 26	WIRING DEVICES
26 56 00	EXTERIOR LIGHTING

SUPPLEMENTAL SPECIAL PROVISIONS CONTINUED

<u>Section</u>	<u>Title</u>
32 84 23	WATER METER ASSEMBLY
32 90 00	PLANTING
32 91 13.19	PLANTING MIXTURE
32 93 13.1	SHREDDED HARDWOOD BARK MULCH
33 00 02.1	FUSIBLE POLYVINYL CHLORIDE (PVC) PIPE
33 00 05	DOUBLE AND TRIPLE WALLED POLYPROPYLENE PIPE

EXHIBITS

EXHIBIT 1 – HISTORIC SITE PHOTOS

APPENDICES

APPENDIX A -	GEOTECHNICAL ENGINEERING REPORT, 2019 CONSTRUCTION DESIGN FOR JAMES STREET BY ECS MIDWEST, LLC (12/17/2018)
APPENDIX B -	GEOTECHNICAL ENGINEERING REPORT FOR DE PERE PROJECT 20-01 BY ECS MIDWEST, LLC (11/22/2019)

CITY OF DE PERE 2020 STANDARD SPECIFICATIONS

CONTRACTING REQUIREMENTS

<u>Section</u>	<u>Title</u>
00 70 00	GENERAL CONDITIONS (See City of De Pere 2020 Standard Specifications)
DIVISION 31 –	EARTHWORK (See City of De Pere 2020 Standard Specifications)
DIVISION 32 –	EXTERIOR IMPROVEMENTS (See City of De Pere 2020 Standard Specifications)
DIVISION 33 –	UTILITIES (See City of De Pere 2020 Standard Specifications)

SECTION 00 11 13

FEBRUARY 6, 2020 – FEBRUARY 13, 2020

CITY OF DE PERE

ADVERTISEMENT TO BID

PROJECT 20-02

STREET RECONSTRUCTION AND UTILITY RELAY

Sealed proposals will be received by the Board of Public Works of the City of De Pere at the Municipal Service Center, 925 South Sixth Street, De Pere, Wisconsin 54115, until 1:00 PM, Thursday, February 27, 2020, at which time they will be publicly opened and read aloud.

Project 20-02 for which proposals are being sought includes the following approximate quantities:

- 940 LF New and Relay Sanitary Sewer (8-inch to 12-inch) and Associated Appurtenances
- 540 LF New and Relay Storm Sewer (8-inch to 24x38-inch) and Associated Appurtenances
- 750 LF New and Relay Water Main (8-inch) and Associated Appurtenances
- 310 LF Directional Drill Water Main (8-inch) and Associated Appurtenances
- New Storm Lateral Installation (6-inch)
- New and Relay Sanitary Sewer Laterals (4-inch and 6-inch)
- New and Relay Water Services (1-inch to 6-inch)
- 1,750 CY Unclassified Excavation
- 1,730 SY Pulverizing Asphaltic Concrete Pavement and Aggregate
- 2,200 Tons 1 ¼" Crushed Aggregate Base Course
- 950 Tons Asphaltic Concrete Pavement
- 320 SY Concrete Pavement Removal and Replacement
- 3,280 LF Concrete Curb and Gutter (24-inch)
- 550 SY 5" New Concrete Sidewalk (5-inch)
- 135 SY New Colored Concrete Sidewalk (5-inch)
- 420 LF of Sandblasting, Welding, and Painting Railing (Double Rung)
- 1,250 LF of Pavement Marking
- 26 EA Light Fixtures, with conduit/wiring
- 70 EA Trees and Shrubs
- 3,740 SF Planting Beds
- Water Wall and Associated Appurtenances
- Furnishings: Benches, Tree Grates, Tables, Trash Receptacles
- Restoration

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

Complete digital project bidding documents are available for viewing and/or downloading at www.QuestCDN.com or may be examined at the office of the Director of Public Works. Digital plan documents may be downloaded for \$15 by inputting Quest project #6645923 on Quest's Project Search page. The QuestCDN website can also be accessed through the City website at www.deperewi.gov. On the homepage, click on the *Projects* icon in the center of the page.

Each proposal shall be accompanied by a certified check or bid bond in an amount equal to five percent (5%) of the bid, payable to the City of De Pere, as a guarantee that if the bid is accepted, the bidder will execute a contract and furnish a contract bond as set forth in the General Conditions of the City of De Pere. In case the bidder fails to file such contract and bond, the amount of the check or bid bond shall be forfeited to the City of De Pere as liquidated damages.

The letting of the contract is subject to the provisions of the following Wisconsin Statutes:

Section 62.15 regarding Public Works.

Section 66.0901(3) regarding Prequalification of Contractor.

Each bidder shall pre-qualify by submitting proof of responsibility on forms furnished by the Director of Public Works. Such forms shall be filed with the Director of Public Works no later than 4:00 PM, Monday, February 24, 2020. Prospective bidders who have previously submitted such forms subsequent to January 1, 2020 will not be required to separately submit such form for this project.

The City of De Pere reserves the right to reject any or all bids, to waive any informalities in bidding and to accept any proposal which the Common Council deems most favorable to the interest of the City of De Pere.

Dated this 6th day of February 2020.

Board of Public Works
City of De Pere
Eric Rakers, P.E.
City Engineer

Project 20-02

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

- 1.1 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
None

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.1 Complete sets of the Bidding documents in the number and for the deposit sum, if any, stated in the Advertisement to Bid may be obtained as stated in the Advertisement for bids.
- 2.2 Complete sets of Bidding Documents shall be used in preparing Bids; Owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.3 Owner, in providing the Bidding Documents on the terms stated in the Advertisement for Bids, does so only for the purpose of obtaining Bids for the Work and does not confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.1 In accordance with Section 66.0901(3), each bidder shall pre-qualify by submitting proof of responsibility on forms furnished by the Director of Public Works. Such forms shall be filed with the Director of Public Works as stated in the Advertisement for Bids. Prospective bidders who have previously submitted such forms after January 1st of this year will not be required to separately submit such form for this project.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA AND SITE

- 4.1 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in the General Conditions.
- 4.2 Underground Facilities
- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- 4.3 Subsurface and Physical Conditions
- A. The technical data includes:
1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except underground Facilities).
 3. In preparation of the Plans and Specifications, Engineer relied upon the following reports of explorations and tests of subsurface conditions at the Site:
 - a) Geotechnical Engineering Report, 2019 Construction Design for James Street by ECS Midwest, LLC, December 17, 2018.
 - b) Geotechnical Engineering Report for De Pere Project 20-01 by ECS Midwest, LLC, November 22, 2019.
- B. Limited Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Contractor may not rely upon or make any claim against Owner, 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.
- 4.4 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. 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. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.
- 4.5 Reference is made to Section 01 10 00: Summary of Work, for work that will be completed and for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other portions thereof related to price) for such other work.
- 4.6 It is the responsibility of each Bidder before submitting a Bid to:
- A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;
 - B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
 - C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

- D. Obtain and carefully study (or accept consequences of not doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
 - E. Agree at the time of submitting its Bid that 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(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
 - F. 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;
 - G. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with 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; and
 - I. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.7 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and, procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – SITE AND OTHER AREAS

- 5.1 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 6 – INTERPRETATIONS AND ADDENDA

- 6.1 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 mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten 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.
- 6.2 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner and Engineer.

ARTICLE 7 – BID SECURITY

- 7.1 A Bid shall be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check or bank money order or Bid bond (on the form attached) issued by a surety meeting the requirements of the General Conditions. Submittal of a Bid Bond on a form other than the Bid Bond form included in the Bidding Documents may be cause for rejection of Bid.
- 7.2 The Bid security of the Successful Bidder will be retained until 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 returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner per the General Conditions.
- 7.3 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 8 – CONTRACT TIMES

- 8.1 The number of days within which, or the dates by which, Milestones are to be achieved and the Work is to be substantially completed and ready for final payment are set forth in the Bid Form and Summary of Work.

ARTICLE 9 – LIQUIDATED DAMAGES

- 9.1 Provisions for liquidated damages are set forth in the General Conditions.

ARTICLE 10 – SUBSTITUTE AND “OR-EQUAL” ITEMS

- 10.1 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or “or-equal” items. Whenever it is specified or described in the Bidding Documents that a substitute or “or-equal” item of material

or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Bid Form and Summary of Work.

ARTICLE 11 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 11.1 The Bidder shall submit with the Bid to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. 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, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 11.2 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposed to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner subject to revocation of such acceptance after the Effective Date of the Agreement.
- 11.3 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 12 – PREPARATION OF BID

- 12.1 The Bid form is included with the Bidding documents.
- 12.2 All blanks on the Bid Form shall be completed by printing in ink or by typewrite and the Bid 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 alternative, and unit price item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.
- 12.3 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporations shall be shown below the seal.
- 12.4 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 12.5 A Bid by a limited liability company shall be executed in the name of the firm by a member 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 below the signature.

- 12.6 A Bid by an individual shall show the Bidder's name and official address.
- 12.7 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 12.8 All names shall be typed or printed in ink below the signatures.
- 12.9 The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 12.10 The address and telephone number for communications regarding the Bid shall be shown.
- 12.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 13 – BASIS OF BID; COMPARISON OF BIDS

- 13.1 Unit Price
 - A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid Schedule.
 - B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accord with 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. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 14 – SUBMITTAL OF BID

- 14.1 A Bid shall be submitted no later than date and time prescribed and at place indicated in Advertisement for Bids and shall be enclosed in a plainly marked package with the Project title (and, if applicable, designated portion of the Project for which the Bid is submitted), 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, sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to City of De Pere, Municipal Service Center, 925 South Sixth Street, De Pere, WI 54115. Electronically transmitted Bids will not be accepted.
- 14.2 See Bid Form for a list of documents typically required to be submitted with the Bid.

ARTICLE 15 – MODIFICATION AND WITHDRAWAL OF BID

- 15.1 A Bid may be modified or withdrawn by an appropriate document duly executed in the 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.
- 15.2 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 16 – OPENING BIDS

- 16.1 Bids will be opened at the time and place indicated in the Advertisement 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 17 – BIDS REMAIN SUBJECT TO ACCEPTANCE

- 17.1 All bids will remain subject to acceptance for the period of time stated in the General Conditions, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 – EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.1 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- 18.2 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 18.3 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.
- 18.4 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Supplier, and other individuals or entities proposed for those portions of the Work for which the identify of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

- 18.5 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 18.6 Bidder agrees to waive any claim it has or may have against the Owner and the respective employees arising out of or in connection with the administration, evaluation or recommendation of any Bid.
- 18.7 If the Contract is to be awarded, Owner will award the Contract to the lowest responsible responsive Bidder whose Bid is in the best interests of the Project.

ARTICLE 19 – CONTRACT SECURITY AND INSURANCE

- 19.1 The General Conditions set forth Owner’s requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds and a certificate of insurance.

ARTICLE 20 – SIGNING OF AGREEMENT

- 20.1 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within ten (10) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten (10) days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of Drawings with appropriate identification.

END OF SECTION

SECTION 00 41 13

CITY OF DE PERE

BID FORM

PROJECT 20-02

This bid, submitted by the undersigned Bidder to the City of De Pere, in accordance with the Advertisement to Bid, which will be received until 1:00 PM, Thursday February 27, 2020 is to furnish and deliver all materials, and to perform and do all work on the project designated by September 25, 2020.

Bidder has examined and carefully prepared the bid from the plans and specifications and has checked the same in detail before submitting said proposal or bid; and that said bidder or bidder's agents, officer or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal or bid.

Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.

Addendum Date

BASIS OF BID:

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

As stated in the attached Unit Price Bid Schedule.

Unit Prices have been computed in accordance with the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

TOTAL BID PRICE: \$ _____

TOTAL ALTERNATE PRICE: \$ _____

TOTAL BASE BID PLUS ALTERNATE PRICE: \$ _____

The City reserves the right to choose the Base Bid or the Base Bid plus Alternate Price

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ATTACHMENTS TO THIS BID

The following documents are submitted with and made a condition of this Bid:

- A. Required Bid Security
- B. Unit Price Bid Schedule (Section 00 41 43)
- C. Proposed Products Form (Section 00 43 33)
- D. Tabulation of Subcontractors (Section 00 43 36)

BID SUBMITTAL

This Bid is submitted by _____ of _____,

The Bidder, being duly sworn, does dispose that they are an authorized representative of

Bidder, if Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in Wisconsin is ___/___/___.

Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of second joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

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

Bidder's Business Address _____

Phone No. _____ Fax No. _____

E-mail _____

SUBMITTED on _____, 20__.

State Contractor License No. _____ (if applicable)

SECTION 00 41 43

CITY OF DE PERE

PROJECT 20-02

BID SCHEDULE – UNIT PRICE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
SANITARY SEWER					
SS-01	Provide 12” PVC Sanitary Sewer	LF	285	\$ _____	\$ _____
SS-02	Remove 12” x 9” and Relay 10” Sanitary Sewer	LF	255	\$ _____	\$ _____
SS-03	Provide 8” PVC Sanitary Sewer	LF	220	\$ _____	\$ _____
SS-04	Remove and Relay 8” PVC Sanitary Sewer	LF	225	\$ _____	\$ _____
SS-05	Remove and Relay 8” PVC Sanitary Sewer (Alley)	LF	300	\$ _____	\$ _____
SS-06	Remove and Relay 6” or 4” PVC Sanitary Lateral	LF	560	\$ _____	\$ _____
SS-07	Provide 6” PVC Sanitary Sewer Lateral	LF	70	\$ _____	\$ _____
SS-08	Provide 4” PVC Sanitary Sewer Lateral	LF	40	\$ _____	\$ _____
SS-09	Provide 12” x 6” Sanitary Wye	EA	1	\$ _____	\$ _____
SS-10	Provide 12” x 4” Sanitary Wye	EA	1	\$ _____	\$ _____
SS-11	Provide 10” x 6” Sanitary Wye	EA	6	\$ _____	\$ _____
SS-12	Provide 8” x 6” Sanitary Wye	EA	12	\$ _____	\$ _____
SS-13	Provide 4’ Diameter Sanitary Sewer Manhole	VF	24	\$ _____	\$ _____
SS-14	Remove and Replace 4’ Diameter Sanitary Sewer Manhole	VF	11	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
SANITARY SEWER CONTINUED					
SS-15	Remove and Replace 4' Diameter Sanitary Sewer Manhole (Alley)	VF	6	\$ _____	\$ _____
SS-16	Provide 4' Diameter Sanitary Sewer Manhole (Wisconsin)	EA	12	\$ _____	\$ _____
SS-17	Reconnect to Existing Sanitary Sewer Pipe	EA	3	\$ _____	\$ _____
SS-18	Connect to Existing Manhole (James Street)	EA	2	\$ _____	\$ _____
SS-19	Abandon/Remove Sanitary Sewer and Appurtenances (College Avenue)	LS	1	\$ _____	\$ _____
STORM SEWER					
ST-01	Remove 29" x 45" and Relay 24" x 38" RCP Class V Storm Sewer	LF	155	\$ _____	\$ _____
ST-02	Remove 24" and Relay 30" RCP Class IV Storm Sewer	LF	235	\$ _____	\$ _____
ST-03	Provide 18" PVC, RCP Class III, or PP Storm Sewer	LF	40	\$ _____	\$ _____
ST-04	Provide 12" PVC or RCP Class III Storm Sewer	LF	120	\$ _____	\$ _____
ST-05	Provide 8" PVC Storm Sewer	LF	50	\$ _____	\$ _____
ST-06	Provide 8" PVC Storm Sewer Lateral	LF	30	\$ _____	\$ _____
ST-07	Provide 6" PVC Storm Sewer Lateral	LF	90	\$ _____	\$ _____
ST-08	Provide 29" x 45" x 6" Tee or 6" Inserta Tee	EA	1	\$ _____	\$ _____
ST-09	Provide 24" x 38" x 6" Tee or 6" Inserta Tee	EA	2	\$ _____	\$ _____
ST-10	Remove and Replace 5' x 5' Box Storm Manhole	VF	3	\$ _____	\$ _____
ST-11	Provide 6' Diameter Storm Manhole	VF	4.5	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
STORM SEWER CONTINUED					
ST-12	Provide 5' Diameter Storm Manhole	VF	21	\$ _____	\$ _____
ST-13	Provide 4' Diameter Storm Manhole	VF	5	\$ _____	\$ _____
ST-14	Remove and Replace Type B Inlet	EA	1	\$ _____	\$ _____
ST-15	Provide Type B Inlet	EA	2	\$ _____	\$ _____
ST-16	Provide Type A Inlet	EA	1	\$ _____	\$ _____
ST-17	Remove Type B Inlet (Superior Street)	EA	1	\$ _____	\$ _____
ST-18	Concrete Collar	EA	2	\$ _____	\$ _____
ST-19	Core Drill Storm Manhole (8" Opening)	EA	2	\$ _____	\$ _____
ST-20	Core Drill Storm Manhole (6" Opening)	EA	1	\$ _____	\$ _____
ST-21	Reconnect to Existing Storm Sewer Structure (College Ave)	EA	1	\$ _____	\$ _____
ST-22	Reconnect to Existing Storm Sewer Pipe w/ Bends (College Ave)	EA	1	\$ _____	\$ _____
WATER MAIN					
W-01	Provide 8" PVC Water Main	LF	755	\$ _____	\$ _____
W-02	Provide 8" PVC Water Main (Directional Drill)	LF	310	\$ _____	\$ _____
W-03	Provide 6" PVC Water Main and Hydrant Lead	LF	135	\$ _____	\$ _____
W-04	Provide 2" HDPE Water Service	LF	110	\$ _____	\$ _____
W-05	Provide 1" HDPE Water Service	LF	235	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
WATER MAIN CONTINUED					
W-06	Provide 2" Corporation, Curb Stop and Box (Self Draining)	EA	1	\$ _____	\$ _____
W-07	Provide 2" Corporation with Plug/Saddle with 2" HDPE	EA	4	\$ _____	\$ _____
W-08	Provide 1" Corporation, Curb Stop and Box	EA	3	\$ _____	\$ _____
W-09	Provide Hydrant 6.5' Bury	EA	3	\$ _____	\$ _____
W-10	Provide 8" Gate Valve	EA	6	\$ _____	\$ _____
W-11	Provide 6" Gate Valve	EA	6	\$ _____	\$ _____
W-12	Provide Connection to Existing Water Main	EA	11	\$ _____	\$ _____
W-13	Abandon/Remove Water Main and Appurtenances (College Ave)	LS	1	\$ _____	\$ _____
W-14	Abandon/Remove Water Main and Appurtenances (Wisconsin Street)	LS	1	\$ _____	\$ _____
W-15	Abandon Water Service 10" PVC Water Main w/Solid Sleeve	EA	1	\$ _____	\$ _____
W-16	Abandon Water Service 8" PVC Water Main w/Solid Sleeve	EA	1	\$ _____	\$ _____
W-17	Provide Hinged-Covered, Non-Freeze Boxed Ground Hydrants	EA	3	\$ _____	\$ _____
W-18	Provide Water Meter Assembly	LS	1	\$ _____	\$ _____
W-19	Provide Water Main Offset	EA	1	\$ _____	\$ _____
W-20	Provide 1/2 Water Main Offset	EA	1	\$ _____	\$ _____
STREET AND DRAINAGE					
SD-01	Provide Clearing and Grubbing (James Street)	LS	1	\$ _____	\$ _____

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
STREET AND DRAINAGE CONTINUED					
SD-02	Unclassified Excavation	CY	870	\$ _____	\$ _____
SD-03	Pulverize Asphaltic Concrete Pavement and Aggregate	SY	2,600	\$ _____	\$ _____
SD-04	Salvage and Reuse Asphaltic Concrete Pavement and Aggregate	CY	575	\$ _____	\$ _____
SD-05	Provide 1 ¼" Crushed Aggregate Base Course	TON	2,450	\$ _____	\$ _____
SD-06	Provide Asphaltic Concrete Pavement Type 4 LT 58-28 S, 1.75" Upper Layer	TON	400	\$ _____	\$ _____
SD-07	Provide Asphaltic Concrete Pavement Type 3 LT 58-28 S, 2.25" Lower Layer	TON	500	\$ _____	\$ _____
SD-08	Provide Asphaltic Concrete Pavement 4" Depth (2.25" Lower, Type 3 LT 58-28 S; 1.75" Upper, Type 4LT 58-28 S) Superior and Huron Street	SY	450	\$ _____	\$ _____
SD-09	Provide Asphaltic Concrete Pavement 4" Depth (2.25" Lower, Type 3 LT 58-28 S; 1.75" Upper, Type 4LT 58-28 S) Wisconsin and Charles Street	SY	90	\$ _____	\$ _____
SD-10	Remove and Replace 24" Concrete Curb and Gutter (Slip Form)	LF	1,880	\$ _____	\$ _____
SD-11	Remove and Replace 24" Concrete Curb and Gutter	LF	200	\$ _____	\$ _____
SD-12	Remove and Replace 24" Concrete Curb and Gutter (Integral Curb)	LF	170	\$ _____	\$ _____
SD-13	Provide 24" Concrete Curb and Gutter	LF	920	\$ _____	\$ _____
SD-14	Provide 18" Concrete Curb and Gutter	LF	245	\$ _____	\$ _____
SD-15	Provide 18" Concrete Curb and Gutter w/Variable Curb Head and Reinforcement	LF	30	\$ _____	\$ _____

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
STREET AND DRAINAGE CONTINUED					
SD-16	Remove and Replace Doweled 9-inch Concrete Pavement-High Early	SY	55	\$ _____	\$ _____
SD-17	Remove and Replace Doweled 9-inch Concrete Pavement (Red Stamped)	SY	25	\$ _____	\$ _____
SD-18	Remove and Replace Doweled 8-inch Concrete Pavement-High Early	SY	345	\$ _____	\$ _____
SD-19	Remove and Replace Doweled 8-inch Concrete Driveway	SY	305	\$ _____	\$ _____
SD-20	Provide 8" Concrete Sidewalk and Driveway	SY	50	\$ _____	\$ _____
SD-21	Provide 8" Concrete Electrical Cabinet Pad	SY	6	\$ _____	\$ _____
SD-22	Remove and Replace 6" Concrete Sidewalk, Ramp and Driveway	SY	270	\$ _____	\$ _____
SD-23	Provide 6" Concrete Sidewalk, Ramp and Driveway	SY	70	\$ _____	\$ _____
SD-24	Provide 5" Concrete Sidewalk	SY	510	\$ _____	\$ _____
SD-25	Provide 5" Colored Concrete Sidewalk	SY	145	\$ _____	\$ _____
SD-26	Remove and Replace 4" Concrete Sidewalk	SY	140	\$ _____	\$ _____
SD-27	Provide 4" Concrete Sidewalk (Red Stamped)	SY	25	\$ _____	\$ _____
SD-28	Provide 9" Concrete Sidewalk (12" Width)- James Street	LF	530	\$ _____	\$ _____
SD-29	Provide Deformed Reinforcing Bars	LF	1,020	\$ _____	\$ _____
SD-30	Provide Drilled Tie Bars	EA	155	\$ _____	\$ _____
SD-31	Provide Drilled Dowel Bars	EA	155	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
STREET AND DRAINAGE CONTINUED					
SD-32	Provide Detectable Warning Field (Natural)	EA	15	\$ _____	\$ _____
SD-33	Provide Landscaping-Topsoil, Seed, and Mulch	SY	970	\$ _____	\$ _____
SD-34	Profile Cut Concrete Curb Head	LF	135	\$ _____	\$ _____
SPECIAL CONSTRUCTION					
SC-01	Provide Pipe Foundation Stabilization	CY	100	\$ _____	\$ _____
SC-02	Provide Inlet Protection, Type D	EA	22	\$ _____	\$ _____
SC-03	Provide Tracking Pad	EA	2	\$ _____	\$ _____
SC-04	Adjust Inlet	EA	4	\$ _____	\$ _____
SC-05	Adjust Manhole	EA	4	\$ _____	\$ _____
SC-06	Repair Railing	LS	1	\$ _____	\$ _____
SC-07	Provide Rectangular Rapid Flash Beacon	EA	2	\$ _____	\$ _____
SC-08	Provide "Do Not Enter" Sign R5-1	EA	2	\$ _____	\$ _____
SC-09	Provide "End One Way" Sign R6-7	EA	1	\$ _____	\$ _____
SC-10	Provide "One Way with Right Arrow" Sign R6-2R	EA	1	\$ _____	\$ _____
SC-11	Provide "3 Hour Parking" Sign	EA	2	\$ _____	\$ _____
SC-12	Provide "No Stopping, Standing or Parking" Sign	EA	2	\$ _____	\$ _____
SC-13	Provide "Loading Zone" Sign	EA	2	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
SPECIAL CONSTRUCTION CONTINUED					
SC-14	Provide Wind Wall Foundation and Install Wind Wall	LS	1	\$ _____	\$ _____
SC-15	Provide Bench, 6' Long	EA	9	\$ _____	\$ _____
SC-16	Provide Bench, 6' Long with Internal LED Illumination (No Backs)	EA	3	\$ _____	\$ _____
SC-17	Provide 2-Top Table and Chairs	EA	3	\$ _____	\$ _____
SC-18	Provide Trash Receptacle	EA	2	\$ _____	\$ _____
SC-19	Provide Recycling Receptacle	EA	2	\$ _____	\$ _____
SC-20	Provide Bollard	EA	1	\$ _____	\$ _____
SC-21	Provide Decorative Tree Grate, 8' x 8' w/2 Flush-Mounted Uplights	EA	8	\$ _____	\$ _____
SC-22	Remove, Salvage, and Install Bicycle Rack	EA	3	\$ _____	\$ _____
SC-23	Remove, Salvage, and Install Historic Marker/Sign	EA	1	\$ _____	\$ _____
SC-24	Remove, Salvage, and Install Traffic Signs	EA	1	\$ _____	\$ _____
SC-25	Provide Traffic Control (George Street)	LS	1	\$ _____	\$ _____
SC-26	Provide Traffic Control and/or Detour (Fourth Street)	LS	1	\$ _____	\$ _____
SC-27	Pavement Marking Epoxy Handicap Symbol (White)	EA	1	\$ _____	\$ _____
SC-28	Pavement Marking Epoxy 18" Line (White)	LF	24	\$ _____	\$ _____
SC-29	Pavement Marking Epoxy 6" Line (White)	LF	90	\$ _____	\$ _____
SC-30	Pavement Marking Epoxy 4" Line (White)	LF	685	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
SPECIAL CONSTRUCTION CONTINUED					
SC-31	Pavement Marking Epoxy 8" Channelizing Line (White)	LF	700	\$ _____	\$ _____
SC-32	Pavement Marking Epoxy 12" Line (White)	LF	280	\$ _____	\$ _____
LANDSCAPE PLANTINGS					
L-01	Provide Backfill (Pulverized Topsoil) for Plant Bed, 24" Depth	CY	320	\$ _____	\$ _____
L-02	Provide Autumn Brilliance Serviceberry, 2 1/2" cal	EA	8	\$ _____	\$ _____
L-03	Provide China Snow Peking Lilac, 10'-12' clump	EA	3	\$ _____	\$ _____
L-04	Provide Bergeson Compact Dogwood, 24" ht	EA	8	\$ _____	\$ _____
L-05	Provide Dwarf Bush Honeysuckle, 24" ht	EA	30	\$ _____	\$ _____
L-06	Provide Dwarf Limelight Hydrangea, 24" ht	EA	19	\$ _____	\$ _____
L-07	Provide Dwarf Pavement Rugosa Rose, 18" ht	EA	11	\$ _____	\$ _____
L-08	Provide Doublefile Viburnum, 36" ht	EA	2	\$ _____	\$ _____
L-09	Provide Taunton Spreading Yew, 30" ht	EA	7	\$ _____	\$ _____
L-10	Provide Lady's Mantle, 1 gal.	EA	10	\$ _____	\$ _____
L-11	Provide Summer Beauty Onion, 4" pot	EA	52	\$ _____	\$ _____
L-12	Provide Blue False Indigo, 1 gal.	EA	7	\$ _____	\$ _____
L-13	Provide Bolton's Aster, 1 gal.	EA	8	\$ _____	\$ _____
L-14	Provide Montrose White Calamint, 1 gal.	EA	73	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
LANDSCAPE PLANTINGS CONTINUED					
L-15	Provide Old Fashioned Pink Bleeding Heart, 1 gal.	EA	3	\$ _____	\$ _____
L-16	Provide Little Grapette Daylily, 1 gal.	EA	31	\$ _____	\$ _____
L-17	Provide Strawberry Candy Daylily, 1 gal.	EA	62	\$ _____	\$ _____
L-18	Provide Guacamole Hosta, 1 gal.	EA	29	\$ _____	\$ _____
L-19	Provide Feedback Bearded Iris, 1 gal.	EA	7	\$ _____	\$ _____
L-20	Provide Walker's Low Catmint, 1 gal.	EA	4	\$ _____	\$ _____
L-21	Provide Bartzella Itoh Peony, 1 gal.	EA	4	\$ _____	\$ _____
L-22	Provide Fireworks Goldenrod, 1 gal.	EA	19	\$ _____	\$ _____
L-23	Provide Woolly Thyme, 4" pot	EA	54	\$ _____	\$ _____
L-24	Provide Feather Reed Grass, 1 gal.	EA	23	\$ _____	\$ _____
L-25	Provide Copper Shouldered Oval Sedge, 4" pot	EA	113	\$ _____	\$ _____
L-26	Provide Pennsylvania Sedge, 4" pot	EA	96	\$ _____	\$ _____
L-27	Provide Tufted Hair Grass, 4" pot	EA	38	\$ _____	\$ _____
L-28	Provide Shenandoah Switch Grass, 1 gal.	EA	21	\$ _____	\$ _____
L-29	Provide Carousel Little Bluestem, 1 gal.	EA	35	\$ _____	\$ _____
L-30	Provide Indiangrass, 1 gal.	EA	7	\$ _____	\$ _____
L-31	Provide Tara Dwarf Prairie Dropseed, 4" pot	EA	84	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
LANDSCAPE PLANTINGS CONTINUED					
L-32	Provide Purple Sensation Allium	EA	74	\$ _____	\$ _____
L-33	Provide Majestic Lavender Crocus Mixture	EA	189	\$ _____	\$ _____
L-34	Provide Dutch Master Daffodil	EA	343	\$ _____	\$ _____
L-35	Provide Ice Follies Large Cupped Daffodil	EA	221	\$ _____	\$ _____
L-36	Provide Tree Protection Fencing	LF	140	\$ _____	\$ _____
L-37	Provide Shredded Hardwood Bark Mulch, 3" Thick	SF	4,200	\$ _____	\$ _____
L-38	Provide 1 Year Landscape Maintenance	LS	1	\$ _____	\$ _____
ELECTRICAL					
E-01	Provide 100Amp/3 Phase Breaker in Existing Panel at James and Michigan Street (Panel A)	LS	1	\$ _____	\$ _____
E-02	Remove, Salvage, and Install Street Light with City Supplied Luminaire	EA	3	\$ _____	\$ _____
E-03	Provide Concrete Light Bases, Type 5 (James Street)	EA	3	\$ _____	\$ _____
E-04	Provide Light Fixture Type OB, Including Concrete Base	EA	4	\$ _____	\$ _____
E-05	Provide Wiring Connection at Light Fixture Type OA	EA	16	\$ _____	\$ _____
E-06	Provide Wiring Connection at Lighted Bench	EA	3	\$ _____	\$ _____
E-07	Provide Wiring Connection at Wind Wall	EA	2	\$ _____	\$ _____
E-08	Provide Conduit-Rigid Non-metallic Schedule 40, 1 1/2"	LF	215	\$ _____	\$ _____
E-09	Provide Conduit-Rigid Non-metallic Schedule 40, 1-inch	LF	525	\$ _____	\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
ELECTRICAL CONTINUED					
E-10	Provide Electrical Wire Lighting, 12 AWG Copper	LF	1,650	\$ _____	\$ _____
E-11	Provide Electrical Wire Lighting, 10 AWG Copper	LF	580	\$ _____	\$ _____
E-12	Provide Electrical Wire Lighting, 3 AWG Copper	LF	650	\$ _____	\$ _____
E-13	Provide Electrical Wire Ground, 8 AWG Copper	LF	140	\$ _____	\$ _____
E-14	Provide Enclosure, NEMA 4 (Panel B)	EA	1	\$ _____	\$ _____
E-15	Provide Branch Panel, TYPE NQ Load Center, 22-Space, 100 Amp MCB	EA	1	\$ _____	\$ _____
E-16	Provide In-Ground Box with Duplex Receptacles	EA	6	\$ _____	\$ _____
E-17	Provide Lighting Control Panel, 8-Relay	EA	1	\$ _____	\$ _____
DEMOLITION					
D-01	Remove Existing Light (Front Street)	EA	1	\$ _____	\$ _____
D-02	Remove Existing Fence (Front Street)	EA	1	\$ _____	\$ _____
D-03	Demolish Building Foundation	LS	1	\$ _____	\$ _____
D-04	Remove Fountain Structure	LS	1	\$ _____	\$ _____
D-05	Remove Brick Pavers	SY	435	\$ _____	\$ _____
D-06	Remove Metal Bollards	EA	8	\$ _____	\$ _____
D-07	Remove Tree Grates	EA	15	\$ _____	\$ _____
D-08	Remove Concrete Light Bases in Pedestrian Mall (North Side of James Street)	EA	9	\$ _____	\$ _____

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
DEMOLITION CONTINUED					
D-09	Remove Concrete Light Bases along James Street	EA	3	\$ _____	\$ _____
D-10	Remove Electrical Cabinet	EA	1	\$ _____	\$ _____
D-11	Remove Asphaltic Concrete Pavement (Superior and Huron Street)	SY	740	\$ _____	\$ _____
D-12	Remove Concrete Sidewalk and Driveway (Superior and Huron Street)	SY	435	\$ _____	\$ _____
D-13	Remove Concrete Curb and Gutter (Superior and Huron Street)	LF	515	\$ _____	\$ _____
D-14	Remove Existing Crosswalk (Wisconsin Street)	LF	80	\$ _____	\$ _____
BASE BID TOTAL					\$ _____

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

ALTERNATE BID SCHEDULE					
ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
WATER WALL					
AB-01	Provide Water Wall and Vault	LS	1	\$ _____	\$ _____
AB-02	Provide 4" PVC Sanitary Sewer Lateral	LF	5	\$ _____	\$ _____
AB-03	Provide Sanitary Sewer Risers	LF	6	\$ _____	\$ _____
AB-04	Provide 10" x 4" Sanitary Wye	EA	1	\$ _____	\$ _____
AB-05	Provide 6" PVC Storm Sewer Lateral	LF	115	\$ _____	\$ _____
AB-06	Provide Nyloplast (8" x 6") Drain	LF	1	\$ _____	\$ _____
ALTERNATE BID TOTAL					\$ _____

SECTION 00 43 13

CITY OF DE PERE

BID BOND

KNOW ALL MEN BY THESE PRESENTS: That _____,

as Principal, hereinafter called Principal, and _____,

as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called City, in the amount of _____ dollars (\$_____) for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presence.

WHEREAS, Principal has made a proposal to the City for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work of Project 20-02 in accordance with drawings and specifications prepared by the Director of Public Works of said City, which proposal is by reference made a part hereof, and is hereinafter referred to as the BID.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall be awarded the contract for said project and Principal shall enter into a contract in accordance with the BID, then this obligation shall be null and void; otherwise it shall remain in full force and effect, provided that:

1. The liability of Surety shall in no event exceed the penalty of this bond.
2. Any suits at law or proceedings, in equity brought or to be brought against Surety to recover any claim hereunder shall be executed within six (6) months from the date of this instrument.

Signed and sealed this _____ day of _____, 20____.

In the presence of:

WITNESS

PRINCIPAL (SEAL)

WITNESS

SURETY (SEAL)

SECTION 00 43 33

PROPOSED PRODUCTS FORM

The following is a list of material, type or model numbers and manufacturers used in the preparation of this proposal and to be used on this project:

<u>ITEM</u>	<u>MATERIAL</u>	<u>SUPPLIER</u>
Valves		
Hydrants		
Manholes		
Rapid Rectangular Flashing Beacon		

SECTION 00 43 36

TABULATION OF SUBCONTRACTORS

The following information is submitted which gives the name, business address, and portion of work for each subcontractor that will be used in the work if the bidder is awarded the contract, and no subcontractor doing work in excess of one-half of one percent of the total amount of the bid and who is not listed will be used without the written approval of the Engineer. Additional numbered pages outlining this portion of the proposal may be attached to this page.

<u>PORTION OF WORK</u>	<u>BUSINESS NAME</u>	<u>BUSINESS ADDRESS</u>
Excavation		
Asphaltic Concrete Pavement		
Concrete Sidewalk & Pavement		
Landscaping		
Electrical		
Utility Work (Sewer and Water)		
Traffic Control		

SECTION 00 51 00

NOTICE OF AWARD

(Contractor)
(Contractor Name)
(Address)
(Address)

Project Description: 20-02 Street Reconstruction and Utility Relay

The City has considered the proposal submitted by you dated (BID DATE) for the above-described project in response to its Advertisement for Bids dated February 6, 2020 and February 13, 2020.

You are hereby notified that the Common Council of the City of De Pere has accepted your bid of (Contract Amount \$_____.00).

You are required to execute the Contract and furnish the required Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said bonds within ten (10) days from the date of this notice, said City will be entitled to consider all your rights arising out of the City's acceptance of your bid as abandoned and as a forfeiture of your Bid Bond. The City will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the City.

Dated this __th day of _____ 2020.

DEPARTMENT OF PUBLIC WORKS

BY: Eric P. Rakers, P.E.
City Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by:

_____, this the _____ day of _____, 20__

By: _____

Title: _____

SECTION 00 52 13

CONTRACT

This Contract, made and entered into this day _____ (date to be affixed by City), by and between **(Contractor Name)**, hereinafter called Contractor, and the City of De Pere, a municipal corporation of the State of Wisconsin, hereinafter called City.

WITNESSETH: That, in consideration of the covenants and agreements herein contained, to be performed by the parties hereto, and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

ARTICLE I - SCOPE OF WORK

The Contractor shall furnish all materials and all equipment and labor necessary, and perform all work shown on the drawings and described in the specifications for the project entitled Project 20-02 Street Reconstruction and Utility Relay, all in accordance with the requirements and provisions of the following documents, which are hereby made a part of this Contract:

- (a) Advertisement for Bids, dated February 6, 2020 and February 13, 2020.
- (b) Drawings designated for Project 20-02 Street Reconstruction and Utility Relay dated February 6, 2020.
- (c) City of De Pere 2020 Construction Specifications.
- (d) Special Provisions dated February 6, 2020.
- (e) Proposal submitted by **(Contractor Name) dated Bid Date.**
- (f) Addenda No. **dated**

ARTICLE II - TIME OF COMPLETION

- (a) The work to be performed under the Contract shall be commenced within **(number spelled out) (___)** calendar days after receipt of written notice to proceed. The work shall be completed within **(Number spelled out) (___) calendar days) or (specific calendar dates)** after receipt of Notice to Proceed.
- (b) Time is of the essence with respect to the date of completion herein above stated. Failure to complete the work within the number of calendar days stated in this Article, or interim dates included in the work sequence in Section 01 10 00, Summary of Work, including any extensions granted thereto, shall entitle the City to deduct from the monies due the Contractor an amount equal to **Update based on 00 70 00 - General Conditions (Page 27)(\$)** per day for each calendar day of delay in the completion of the work. Such amount shall be considered and treated not as a penalty but as liquidated damages, which the City will sustain, by failure of the Contractor to complete the work within the time stated.

ARTICLE III - PAYMENT

- (a) The Contract Sum. The City shall pay to the Contractor for the performance of the Contract the amounts determined for the total number of each of the following units of work completed at the unit price stated

thereafter. The number of units contained in this schedule is approximate only, and the final payment shall be made for the actual number of units that are incorporated in or made necessary by the work covered by the Contract.

- (b) Progress Payments. The City shall make payments on account of the Contract as follows:
1. On not later than the fourth Friday of every month the Contractor shall present to the City an invoice covering an estimate of the amount and proportionate value of the work done as verified by the City under each item of work that has been completed from the start of the job up to and including the fourth Friday of the preceding month, and the value of the work so completed determined in accordance with the schedule of unit prices for such items, together with such supporting evidence as may be required. This invoice shall also include an allowance for the cost of such materials and equipment required in the permanent work as have been delivered to the site but not as yet incorporated in the work.
 2. On not later than the third week of the following month, the City shall, after deducting previous payments made, pay to the Contractor 95% of the amount of the approved invoice, retaining 5% of the estimate of work done until 50% of the work has been completed. At 50% completion of the work, the previous retainage shall not yet be paid, but further partial payments shall be made in full to the contractor without additional retainage being taken unless the engineer certifies that the work is not proceeding satisfactorily. If the work is not proceeding satisfactorily, additional amounts may be retained. After substantial completion, an amount retained may be paid to the contractor, keeping retained only such amount as is needed for the remaining work.
 3. The Contractor shall notify the City in writing when all work under this Contract has been completed. Upon receipt of such notice the City shall, within a reasonable time, make the final inspection and issue a final certificate stating that the work provided for in this Contract has been completed and is accepted under the terms and conditions thereof, and that the entire balance due the Contractor as noted in said final certificate is due and payable. Before issuance of the final certificate the Contractor shall submit evidence satisfactory to the City that payrolls, material bills, and other indebtedness connected with the work under this Contract have been paid. The City shall make final payment as soon after issuance of the final certificate as practicable.

ARTICLE IV – CONTRACT DOCUMENTS

- (a) Contents
1. The Contract documents consist of the following:
 - a. This Contract (pages 00 52 13-1 to 0052-13-3, inclusive).
 - b. Payment bond (pages 00 61 13-1 to 00 61 13-2, inclusive).
 - c. Performance bond (page 00 61 16-1).
 - d. General Conditions (pages 00 70 00-1 to 00 70 00-27, inclusive).
 - e. Specifications as listed in the table of contents of the Project Manual.
 - f. Drawings consisting of ___ sheets with each sheet bearing the following general title: ___[or] the Drawings listed on attached sheet index.
 - g. Addenda (numbers ___ to ___ inclusive), dated _____.
 - h. Exhibits to this Agreement (enumerated as follows):
 - 1) Contractor's Bid (pages 00 41 13-1 to 00 41 13-3, inclusive).
 - 2) Bid Schedule – Unit Prices (Pages 00 41 43-1 to 00 41 43- , inclusive).
 - 3) Proposed Products Form (Page 00 43 33-1).

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

- 4) Tabulation of Subcontractors (page 00 43 36-1).
- 5) Documentation submitted by Contractor prior to Notice of Award (00 51 00-1).
- i. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - 1) Notice to Proceed (Page 00 55 00-1).
 - 2) Change Orders.
- 2. The documents listed in Paragraph (a) Contents, are attached to this Agreement (except as expressly noted otherwise above).
- 3. There are no Contract Documents other than those listed above in this Article IV.

IN WITNESS WHEREOF, the parties hereto have executed this Contract, the day and year first written above.

(WITNESS)	(CONTRACTOR) (SEAL)
(WITNESS)	BY: _____

	(TITLE)
	BY: _____

	(TITLE)

CITY OF DE PERE (SEAL)

Approved as to Form By: _____ (City Attorney)

Sufficient funds are available to provide for the payment of this obligation.

	(COMPTROLLER)
BY: _____	BY: _____
(MAYOR)	(CITY CLERK)

SECTION 00 55 00

NOTICE TO PROCEED

Date: _____

(CONTRACTOR NAME)
(ADDRESS)
(ADDRESS)

PROJECT: Project 20-02 Street Reconstruction and Utility Relay

You are hereby notified to commence work in accordance with the CONTRACT dated _____, within ten (10) days of this Notice. All work under this contract shall be completed within _____ (NUMBER IN WORDS) (___#) consecutive days from the start of construction or _____ (DATE) whichever comes first.

Department of Public Works

By: Eric P. Rakers, P.E.
Title: City Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____, this ____ day of _____, 20__.
Company Name

Signature

BY: _____
Printed Name

TITLE: _____

SECTION 00 61 13

CITY OF DE PERE

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That **(CONTRACTOR NAME)**, as Principal, hereinafter called Contractor, and _____, as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called the City, for the use and benefit of claimants as herein below defined in the **amount** _____ **(CONTRACT AMT. SPELLED OUT) (\$ _____)** for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ (date to be affixed by City) entered into a contract with City for Project 20-02, in accordance with drawings and specifications prepared by the Director of Public Works of said City, which contract is by reference made a part hereof, and is hereinafter referred to as the CONTRACT.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payments to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the CONTRACT, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with Contractor or with a subcontractor of Contractor for labor, material, or both, used or reasonably required for use in the performance of the contract, labor and material being construed to include that part of water, gas, power, lights, heat, oil, gasoline, telephone service, or rental of equipment directly applicable to the contract.
2. The above named Contractor and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant may sue on this bond for the use of such claimant in the name of the City, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon, provided, however, that the City shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
 - a. Unless claimant shall have given written notice to any two of the following: The Contractor, the City, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail, postage prepaid, in an envelope addressed to the Contractor, City, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of Wisconsin, save that such service need not be made by a public officer.
 - b. After the expiration of one (1) year following the date on which Contractor ceased work on said CONTRACT.

**Project 20-02
Street Reconstruction and Utility Relay**

City of De Pere

- c. Other than in a state court of competent jurisdiction in and for the County or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

- 4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens, which may be filed or recorded against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

SIGNED AND SEALED THIS _____ DAY OF _____, 20____.

In Presence of:

_____	_____
(WITNESS)	(CONTRACTOR)
_____	_____
(WITNESS)	(SURETY)

SECTION 00 61 16

CITY OF DE PERE

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That **(CONTRACTOR'S NAME)**, as Principal, hereinafter called Contractor, and _____, as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called City, in the amount of **(AMOUNT WRITTEN OUT)** (\$_____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assign, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ (date to be affixed by City), entered into a contract with the City for Project 20-02, in accordance with drawings and specifications prepared by the Director of Public Works of said City, which contract is by reference made a part hereof, and is hereinafter referred to as the CONTRACT.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform said CONTRACT, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever Contractor shall be, and declared by the City to be in default under the CONTRACT, the City having performed City's obligations there under, the Surety may promptly remedy the default, or shall promptly

1. Complete the CONTRACT in accordance with its terms and conditions or
2. Obtain a bid or bids for submission to City for completing the CONTRACT in accordance with its terms and conditions, and upon determination by the City and Surety of the lowest responsible bidder, arrange for a contract between such bidder and City make available as work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable by City to Contractor under the CONTRACT and any amendments thereto, less the amount properly paid by City to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the CONTRACT falls due. No right of action shall accrue on this bond to or for the use of any person or corporation other than the owner named herein or the heirs, executors, administrators or successors of City.

SIGNED AND SEALED THIS _____ DAY OF _____, 20____.

In the Presence of:

(WITNESS)	(CONTRACTOR)	(SEAL)
-----------	--------------	--------

(WITNESS)	(SURETY)	(SEAL)
-----------	----------	--------

SECTION 00 62 76

APPLICATION FOR PAYMENT

Contractor's Application for Payment No.

Application Period:	Application Date:
Owner: City of De Pere	Contractor:
	Contractor's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
Total	\$0.00	\$0.00
NET CHANGE BY CHANGE ORDERS:		\$0.00

1. ORIGINAL CONTRACT PRICE:.....	
2. Net change by Change Orders and Written Amendments (+ or -):.....	\$0.00
3. CURRENT CONTRACT PRICE (Line 1 plus Line 2):.....	\$0.00
4. Total completed and stored to date Column H on Progress Estimate:....	\$0.00
5. Retainage (per Agreement):	
a. Work Completed - Column H (95% up to 50% of Contract or 2.5% of 100% of Contract	\$0.00
6. AMOUNT ELIGIBLE TO DATE (Line 4 minus 5).....	\$0.00
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application).....	\$0.00
8. AMOUNT DUE THIS APPLICATION (Line 6 minus Line 7).....	\$0.00

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that:(1) all previous progress payments received from Owner on account of Work done under Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by the Application for Payment is in accordance with the Contract Documents and is not defective.

By: _____ Date: _____

Payment of: \$ _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ (Contractor) _____ (Date)

Payment of: \$ _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ (Owner) _____ (Date)

SECTION 00 65 16

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project:	
Owner:	Owner's Contract No.:
Contractor:	

This [tentative] [definitive] Certificate of Substantial Completion applies to:

All Work under the Contract Documents: The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Contractor and Engineer, and found to be substantially complete. The Date of Substantial completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

Amended Responsibilities Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer

Date

Accepted by Contractor

Date

SECTION 01 10 00

SUMMARY OF WORK

PART 1 – GENERAL

a.1 SUMMARY

A. Section Includes

1. References
2. Work Covered by the Contract Documents
3. Work Sequence
4. Use of Premises
5. Warranty
6. Work by Others
7. Project Utility Sources
8. Miscellaneous Provisions

1.2 REFERENCES

- A. General Specifications. The work under this contract shall be in accordance with the City of De Pere, 2020 Construction Specifications and these Special Provisions and plans, and the latest edition of the Wisconsin Department of Transportation Standards Specifications for Highway and Structure Construction, where referenced in the City Specifications.
- B. Definitions. Any reference to the “state” or the “department” in said Standard Specifications shall mean the “City of De Pere” for the purposes of this contract.
- C. Industry 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 made 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 standards is specified 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.

1.3 WORK COVERED BY THE CONTRACT DOCUMENTS

A. Project Identification

1. Project Location

- a. Alley between Ontario Street and Winnebago Street from George Street to end.
 - b. Charles Street from Wisconsin Street to Michigan Street
 - c. College Avenue from cul de sac to Fourth Street
 - d. Front Street Parking Lot from existing parking lot to Cass Street
 - e. James Street from Broadway Street to Wisconsin Street
 - f. Huron Street from Charles Street to George Street
 - g. Superior Street from Charles Street to George Street
 - h. Wisconsin Street from Lewis Street to Charles Street
2. Work will be performed under the following prime contract:
 - a. 20-02 Street Reconstruction and Utility Relay

B. The Work includes:

1. Selective demolition of reinforced concrete building foundation and features.
2. Landscaping including trees, shrubs, planting beds, turf restoration.
3. Electrical services and lighting fixtures, new and salvaged.
4. Furnishings including benches, tree grates, tables, trash/recycling receptacles.
5. Water wall feature including, foundation, service vault, plumbing, and control panel.
6. Wind wall feature, including foundation (with electrical service) only.
7. New and salvaged sign installation.
8. Water main and associated appurtenance relay and new.
9. Storm sewer and associated appurtenances relay and new, spot storm sewer, inlet lead and inlet repair and replacement.
10. Sanitary sewer and associated appurtenances relay and new and lateral replacement.
11. Manhole adjustment and repair.
12. Spot concrete curb and gutter repair and replacement and new curb and gutter.
13. Driveway and sidewalk removal and replacement.
14. Mill asphaltic concrete pavement.
15. Pulverize asphaltic concrete pavement.
16. Unclassified excavation.
17. Asphaltic concrete paving.
18. Terrace restoration.
19. Tree and stump removal.
20. Erosion Control.
21. Traffic Control.

1.4 WORK SEQUENCE

- A. Conduct construction activities to maintain access to businesses and residences throughout construction.
- B. Topsoil, seed, and mulch shall be completed prior to asphaltic concrete pavement placement.
- C. All water main tracer wire is to be tested prior to paving.
- D. The Cellcom Marathon occurs on Sunday, May 17, 2020. The route crosses through the Broadway Street and James Street intersection. Restrict access to site with construction fencing as necessary for public safety.
- E. Location Specific Work Sequence Details
 - 1. Alley
 - a. The sanitary manhole in the alley shall be constructed immediately after contracts are signed. After constructing the manhole, temporarily restore the area and leave the site. The City will evaluate the condition of the sanitary sewer and determine if the sewer lined or needs to be relayed.
 - b. Installation of the manhole will not start the construction days calendar.
 - c. George Street is the primary route for traffic to Notre Dame School.
 - 2. Charles Street and Wisconsin Street
 - a. Construction cannot start until June 8th.
 - b. Construction shall be completed by July 31st.
 - 3. College Avenue
 - a. Construction cannot start until May 18th.
 - b. Construction shall be completed by August 21st.
 - 4. Front Street Parking Lot
 - a. Celebrate De Pere will occur from May 22nd thru May 25th. No work will be allowed during this time. The trench on Cass Street will be stabilized with cold mix for the event.
 - 5. Huron and Superior Street
 - a. Construction cannot start until June 8th.
 - b. Construction shall be completed by August 21st.
 - 6. James Street
 - a. Celebrate De Pere will occur from May 22nd thru May 25th. No lane closures on adjacent streets will be permitted during this time.
 - b. The Memorial Day Parade will occur on May 25th on Broadway Street. The sidewalk along Broadway Street shall be open for this event. Any disturbed areas on the Broadway Street sidewalk will be stabilized with cold mix. Provide construction fencing along the construction limits at Broadway Street.
- F. The calendar days listed below are the allowed durations for each location from the beginning of construction of the street or site to the substantial completion of the area. The start and end dates for each location is also listed below to better illustrate the window to complete work.

Location	Start Date	End Date	Calendar Days
Alley	N/A	9-25-2020	28
Charles and Wisconsin Street	6-8-2020	8-21-2020	14
College Avenue	5-18-2020	7-31-2020	70
Front Street Parking Lot	N/A	9-25-2020	28
Huron and Superior Street	6-8-2020	8-21-2020	28
James Street	N/A	9-25-2020	120

Please note that the allowed contract calendar days shown in the table above exceed the total project duration. It is expected that the contractor work on multiple streets concurrently to ensure the satisfactory completion of the project within the project duration. Failure to meet the interim contract dates listed above warrants the enforcement of liquidated damages outlined in the City of De Pere Standard Specifications.

1.5 USE OF PREMISES

- A. Contractor shall have full use of the premises for construction operations, including use of the Project Site, as allowed by law, ordinances, permits, easement agreements and the Contract documents.
- B. Contractor’s use of premises is limited only 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 premises.
- E. Move any stored material or products which interfere with operations of Owner or other Contractors.

1.6 WARRANTY

- A. The Contractor warrants and guarantees to the City that all work shall be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects will be given to the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this proposal.
- B. If within one (1) year after the date of contract work completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents or by a special provision of the Contract Documents, any work is found to be defective, the Contractor shall comply in accordance with the City’s written instructions. These written instructions will include either correcting such defective work or, if it has been rejected by the City, removing it from the site and replacing it with non-defective work. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency

where delay would cause serious risk or loss or damage, the City may have the defective work corrected or the rejected work removed and replaced. All direct and indirect costs of correction or removal and replacement of defective work, including compensation for additional professional services, shall be paid by the Contractor.

1.7 WORK BY OTHERS

- A. Charter Communications plans to install a new fiber optic buried cable along the south right-of-way line by direction drilling methods.
- B. Utility work including rim adjustments and new communications line will be occurring during construction. Coordinate construction activities with utility contractors, including AT&T, Wisconsin Public Service Corp., and Spectrum (Charter Communications).
- C. The private property owner of the existing building foundation (and ceiling) is to construct a new wall, east-west at right-of-way prior to selective demolition on James Street. Coordinate with property owner to ensure placement of wall prior to commencement of Work.
- D. The Owner is awarding a separate contract for the wind wall feature, which will be produced, delivered, to the site. Installation is included in this contract. The electrical wiring and controls for the wind wall feature will be furnished and installed as part of the water wall (bid unit price).
- E. The City will complete removal activities prior to construction as identified elsewhere.

1.8 PROJECT UTILITY SOURCES

- A. Green Bay Metropolitan Sewer District (NEW Water), Lisa Sarau, (lsarau@newwater.us) (920-438-1039)
- B. AT&T, Shea Gorzelanczyk, (sg2528@att.com) (920-433-4250)
- C. Wisconsin Public Service, Bob Laskowski, (rtlaskowski@wisconsinpublicservice.com) (920-617-2775)
- D. Charter, Vince Albin, (vince.albin@charter.com) (920-378-0444)
- E. Nsight, Rick Vincent, (rick.vincent@nsight.com) (920-617-7316)
- F. TDS Metrocom, Steve Jakubiec, (steve.jakubiec@tdstelecom.com) (920-882-4166)
- G. Net-Lec (Mi-Tech Services), Dennis Lafave, (dlafave@mi-tech.us) (920-619-9774)
- H. Level3 (Mi-Tech Services), Chris Kraus, (ckraus@mi-tech.us) (414-550-6201)

1.9 MISCELLANEOUS PROVISIONS

- A. Notification to Residents – The Contractor shall individually notify all residents and businesses 2-weeks prior to the start of operations, giving an estimated time that vehicle movement will be limited or prohibited. Property owners shall be notified 24-hours prior to closing a drive.

- B. Maintain access to the entrance for 134 Broadway Street (off of James Street) during construction, except during the placement of concrete at the entrance. Access can be maintained with a gravel surface.
- C. The City shall be notified at least 7 days in advance of work to remove existing benches, trash receptacles, and (9) pedestrian walkway light poles. Other signage, light fixtures, and bike racks (and flag pole if necessary) shall be removed, salvaged, and stored by Contractor for reinstallation, as applicable.
- D. During street excavation, all exposed subgrade shall be graded and covered with crushed aggregate base course at the end of each day.
- E. Specific color for indicated colored concrete shall be approved by Owner under provisions of Section 01 33 00 Submittals.
- F. Per the soil boring, there is approximately 18” of existing base course under the existing asphalt. All gravel surfaces shall be maintained if the existing asphalt is removed at the beginning of the project and rutting, pumping, or failures occur.
- G. Basement crack surveys shall be completed for buildings along James Street before any construction activities around the property. Thoroughly inspect the building structure for existing defects, including interior and exterior walls. Submit a written report of the inspector’s name, date of inspection and descriptions and locations of defects and photographs and/or video.
- H. Garage slab surveys shall be completed for the garages along the alley before any construction activities around the property. Thoroughly inspect the structure for existing defects, including interior and exterior walls. Submit a written report of the inspector’s name, date of inspection and descriptions and locations of defects and photographs and/or video.
- I. City staff will be verifying if sanitary laterals are active during construction. This will be completed with a City push camera. The Contractor will assist City staff by placing the camera in the lateral and pushing up the line.
- J. Ingress and egress to the site of work for delivery of materials, hauling of excavation, daily construction activities and all vehicular traffic shall be as follows:

Location	Route
Alley	George Street
Charles and Wisconsin Street	Lewis Street from Broadway Street or Michigan Street from George Street
College Avenue	Fourth Street from Reid Street
Front Street Parking Lot	Cass Street from Broadway Street
Huron and Superior Street	George Street

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 22 01

MEASUREMENT AND PAYMENT SANITARY SEWER

PART 1 – GENERAL

1.1 SUMMARY

- | | |
|--|--------------------------------------|
| A. Section includes: | <u>Bid Item No.</u> |
| 1. Sanitary Sewer Mains (Granular Backfill) | SS-01, SS-02, SS-03,
SS-04, SS-05 |
| 2. Sanitary Sewer Laterals | SS-06, SS-07, SS-08,
AB-02 |
| 3. Sanitary Sewer Risers | AB-03 |
| 4. Sanitary Sewer Service Branches | SS-09, SS-10, SS-11,
SS-12, AB-04 |
| 5. Sanitary Sewer Manholes | SS-13, SS-14, SS-15,
SS-16 |
| 6. Reconnect to Existing Sanitary Pipe | SS-17 |
| 7. Connect to Existing Manhole | SS-18 |
| 8. Abandon/Remove Sanitary Sewer and Appurtenances | SS-19 |
- B. Unit Prices include:
1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for sanitary sewer systems.
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
1. Traffic Control.
 2. Sawcutting asphalt and/or concrete.
 3. Removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
 4. Dewatering.
 5. Bypass pumping.
 6. Excavation.
 7. Open Trench installation method (unless bid item specifies other method).
 8. Pipe Bedding.

9. Backfilling and compacting native obtained from the excavation.
10. Supplying, hauling, backfilling and compacting granular material.
11. Loading, hauling and disposing of surplus excavated material.
12. Landscaping – turf establishment surface restoration and trees and bushes damaged during construction.
13. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.
14. Site access requirements including temporary aggregate material as required for local traffic access.
15. Bulkhead and abandoned existing sanitary sewer with flowable fill as shown on Drawings.
16. 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.
17. Dust control.
18. Remove and replace existing mailboxes and traffic signs.
19. Restroom facilities.
20. Easement and right-of-way requirements.
21. Construction staking and other survey work not provided by the Engineer.
22. Regulatory requirements.
23. Preconstruction videotaping and video equipment.
24. Quality assurance and quality control testing and inspections.
25. Shop drawings and other submittals.

1.3 SANITARY SEWER MAINS (GRANULAR BACKFILL)

- A. The unit price for Sanitary Sewer Main (Granular Backfill) work includes:
 1. General Work Items of Article 1.2.
 2. Sanitary sewer pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method.
 3. Excavation, breakdown and removal of abandoned piping inside the trench area, including plugging of existing connections.
 4. Excavation, breakdown and removal of abandoned pipeline structures inside the trench area, including plugging of existing connections.
- B. Measurement of payment will be the actual horizontal length along the centerline of the installed sewer from centerline of the manhole to centerline of manhole with no deductions for manholes, sewer services branches and other fittings.
- C. The unit of measurement for payment is linear feet.

1.4 SANITARY SEWER LATERALS

- A. The unit price for Sanitary Sewer Laterals work includes:
 1. General Work Items of Article 1.2.
 2. Sanitary sewer lateral pipe and fittings of the material stated in the Unit Price Bid Schedule and installed using the open trench method.

3. Watertight plug in the end of the sewer service lateral or connection including transition coupling to the existing building sewer lateral.
4. Tracer wire.
5. Install an 8' – 4" X 4" board at the end of the lateral.

B. Measurement of 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, easement or existing sewer service lateral with no deductions for fittings.

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

1.5 SANITARY SEWER RISERS

A. The unit price for Sanitary Sewer Risers work includes:

1. General Work Items of Article 1.2.
2. Sanitary sewer riser pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method.
3. Risers to be installed at the main.

B. Measurement for payment will be the actual length of pipe along the centerline of the installed sewer service riser pipe from centerline of fitting to centerline of fitting having a vertical rise of 45 degrees or greater with no deductions for fittings.

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

1.6 SANITARY SEWER SERVICE BRANCHES

A. The unit price for Sanitary Sewer Service Branches work includes:

1. General Work Items of Article 1.2.
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. Plug (where required).

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.7 SANITARY SEWER MANHOLES

A. The unit price for Sanitary Sewer Manholes work includes:

1. General Work Items of Article 1.2.
2. Precast reinforced concrete components.
3. Joint flexible gasket material.
4. Resilient flexible connector between the manhole structure and the sewer pipe.
5. Adjusting rings and bituminous plastic cement sealant at chimney.
6. Manhole steps.

7. Manhole frame and cover (Neenah Foundry R-1500 Manhole Cover with Non-Rocking Lid or equal). Sanitary Sewer manhole covers shall have gaskets and concealed pick holes.
8. Bedding material.
9. Sewer pipe stub with connections and watertight plug (where required).
10. Final casting adjustment.

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.

1.8 RECONNECT TO EXISTING SANITARY SEWER PIPE

A. The unit price for Reconnect to Existing Sanitary Sewer Pipe work includes:

1. General Work Items of Article 1.2.
2. Sanitary Sewer Pipe same material strength or better than sewer main. Provide Fernco with stainless steel sheer bands and connection water tight seal.
3. Backfilling and compaction.

B. Measurement for payment will be the actual number complete.

C. The unit of measurement for payment is each.

1.9 CONNECT TO EXISTING SANITARY MANHOLE

A. The unit price for Connect to Existing Sanitary Manhole work includes:

1. General Work Items of Article 1.2.
2. Modify existing sanitary sewer manhole opening (where required).
3. Install a gasket around the new sanitary sewer.
4. Provide concrete around the pipe, gasket, and manhole opening to form a water tight seal.
5. Reform flow line in existing sanitary manhole.

B. Measurement for payment will be the actual number complete.

C. The unit of measurement for payment is each.

1.10 ABANDON / REMOVE SANITARY SEWER AND APPURTENANCES

A. The unit price for Abandon/Remove Sanitary Sewer and Appurtenances work includes:

1. General Work Items of Article 1.2.
2. Excavating
3. Install bulkheads and abandon sanitary sewer.
4. Removing existing sanitary sewer and/or manholes where in conflict with other utilities.
5. Providing and placing flowable fill.
6. Backfilling and compacting.
7. Removal and disposal of appurtenances as shown on the Drawings.

B. Measurement for payment will not be made. This includes all of the project area.

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

END OF SECTION

SECTION 01 22 02

MEASUREMENT AND PAYMENT STORM SEWER

PART 1 – GENERAL

1.1 SUMMARY

- | <u>A. Section includes:</u> | <u>Bid Item No.</u> |
|--|--------------------------------------|
| 1. Storm Sewer Mains (Granular Backfill) | ST-01, ST-02, ST-03,
ST-04, ST-05 |
| 2. Storm Sewer Laterals | ST-06, ST-07, AB-05 |
| 3. Storm Sewer Service Branches | ST-08, ST-09 |
| 4. Storm Sewer Manholes | ST-10, ST-11, ST-12,
ST-13 |
| 5. Catch Basin/Inlets | ST-14, ST-15, ST-16,
AB-06 |
| 6. Remove Type B Inlet | ST-17 |
| 7. Concrete Collar | ST-18 |
| 8. Core Drill Storm Manhole | ST-19, ST-20 |
| 9. Reconnect to Storm Manhole | ST-21 |
| 10. Reconnect to Storm Pipe | ST-22 |
- B. Unit Prices include:**
1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.

1.2 GENERAL WORK ITEMS

- A.** Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for storm sewer systems.
- B.** If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
1. Traffic Control.
 2. Sawcutting asphalt and/or concrete.
 3. Removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
 4. Dewatering.
 5. Excavation.
 6. Open trench installation method (unless bid item specifies other method).
 7. Pipe bedding.

8. Backfilling and compacting native obtained from the excavation.
9. Supplying, hauling, backfilling and compacting granular material.
10. Loading, hauling and disposing of surplus excavated material.
11. Landscaping – turf establishment surface restoration and trees and bushes damaged during construction.
12. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.
13. Site access requirements including temporary aggregate material as required for local traffic access.
14. Bulkhead and abandon existing storm sewer with flowable fill as shown on drawings.
15. 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.
16. Dust control.
17. Remove and replace existing mailboxes and traffic signs.
18. Restroom facilities.
19. Easement and right-of-way requirements.
20. Construction staking and other survey work not provided by the Engineer.
21. Regulatory requirements.
22. Preconstruction videotaping and video equipment.
23. Quality assurance and quality control testing and inspections.
24. Shop drawings and other submittals.

1.3 STORM SEWER MAINS (GRANULAR BACKFILL)

- A. The unit price for Storm Sewer Main (Granular Backfill) work includes:
1. General Work Items of Article 1.2.
 2. Storm sewer pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method.
 3. Excavation, breakdown and removal of abandoned piping inside the trench area, including plugging of existing connections.
 4. Excavation, breakdown and removal of abandoned pipeline structures inside the trench area, including plugging of existing connections.
- B. Measurement of payment will be the actual horizontal length along the centerline of the installed sewer from centerline of the manhole to centerline of manhole with no deductions for manholes, sewer services branches and other fittings.
- C. The unit of measurement for payment is linear feet.

1.4 STORM SEWER LATERALS

- A. The unit price for Storm Sewer Laterals work includes:
1. General Work Items of Article 1.2.
 2. Storm sewer lateral pipe and fittings of the material stated in the Unit Price Bid Schedule and installed using the open trench method.

3. Watertight plug in the end of the sewer service lateral or connection including transition coupling to the existing building sewer lateral.
4. Tracer wire.
5. Install an 8' – 4" X 4" board at the end of the lateral.

B. Measurement of 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, easement or existing sewer service lateral with no deductions for fittings.

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

1.5 STORM SEWER SERVICE BRANCHES/INSERTA TEES

A. The unit price for Storm Sewer Service Branches/Inserta Tees work includes:

1. General Work Items of Article 1.2.
2. Storm sewer service branches of same material strength or better than storm sewer main pipe (where required).
3. Core drilling into concrete storm sewer main (where required).
4. Installation along with the storm sewer main pipe installation.
5. Plug (where required).

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.6 STORM SEWER MANHOLES

A. The unit price for Storm Sewer Manholes work includes:

1. General Work Items of Article 1.2.
2. Precast reinforced concrete components.
3. Joint flexible gasket material.
4. Grout seal between the manhole and structure and the sewer pipe.
5. Adjusting rings and bituminous plastic cement sealant at chimney.

6. Manhole steps.
7. Manhole frame and cover.
8. Bedding material.
9. Sewer pipe stub with connections and watertight plug (where required).
10. Final casting adjustment.

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.

1.7 CATCH BASIN/INLETS

- A. The unit price for Catch Basin/Inlets work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Precast reinforced concrete components.
 - 3. Joint flexible gasket material.
 - 4. Grout seal between the catch basin/inlet structure and the sewer pipe.
 - 5. Adjusting rings grouted in place.
 - 6. Casting frame and grate.
 - 7. Bedding material.
 - 8. Supply and install 6 to 10 feet of 4 inch flexible perforated plastic pipe with geotextile wrap subgrade drain.
 - 9. Sand fill and Class "B" concrete floor and flow line.
 - 10. Temporary cover over catch basin/inlet to prevent eroded materials from entering.
 - 11. Final casting adjustment.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

1.8 REMOVE TYPE B INLET

- A. The unit price for Remove Type B Inlet work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Excavating
 - 3. Install bulkheads on inlet lead (if required).
 - 4. Removing existing inlet as shown on the plans.
 - 5. Backfilling and compacting.
 - 6. Removal and disposal of appurtenances as shown on the Drawings.
- B. Measurement for payment will be the actual number complete.
 - 1. Item applies only to specific inlets listed in bid schedule.
- C. The unit of measurement for payment is each.

1.9 CONCRETE COLLAR

- A. The unit price for Concrete Collar work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing and installing concrete and wire or mesh components.
 - 3. Connection to storm sewer pipe or manhole.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

1.10 CORE DRILLING TO STORM MANHOLE

- A. The unit price for Core Drilling to Storm Manhole work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Core drilling into existing storm sewer manhole (where required).
 - 3. Install A-Lok boot.
 - 4. Reform flow line in existing storm manhole.
- B. Measurement for payment will be the actual number complete.
- C. The unit of measurement for payment is each.

1.11 CONNECT TO STORM MANHOLE

- A. The unit price for Connect to Storm Manhole work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Modify existing storm sewer manhole opening (where required).
 - 3. Provide concrete around the pipe, gasket, and manhole opening to form a sediment tight seal.
 - 4. Reform flow line in existing storm manhole.
- B. Measurement for payment will be the actual number complete.
- C. The unit of measurement for payment is each.

1.12 RECONNECT TO STORM SEWER PIPE

- A. The unit price for Reconnect to Storm Sewer Pipe work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Storm sewer pipe same material strength or better than sewer main. Provide Fernco with stainless steel sheer bands and connection water tight seal.
 - 3. Bends as required in the field.
 - 4. Backfilling and compaction.
- B. Measurement for payment will be the actual number complete.
- C. The unit of measurement for payment is each.

END OF SECTION

SECTION 01 22 03

MEASUREMENT AND PAYMENT WATER SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

	<u>Bid Item No.</u>
A. Section includes:	
1. Water Mains (Granular Backfill)	W-01
2. Water Mains (Directional Drill)	W-02
3. Water Services	W-04, W-05
4. Corporation and Curb Stop	W-06, W-08
5. 2” Corporation with Plug/Saddle and HDPE	W-07
6. Fire Hydrants	W-09
7. Hydrant Leads	W-03
8. Valves	W-10, W-11
9. Connection to Existing Water Mains	W-12
10. Abandon/Remove Water Main and Appurtenances	W-13, W-14
11. Abandon Water Service at PVC Water Main w/ Solid Sleeve	W-15, W-16
12. Hinged Covered Box, Non-Freeze Boxed Ground Hydrants	W-17
13. Water Meter Assembly	W-18
14. Water Main Offset	W-19, W-20

B. Unit Prices include:

1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for water systems.
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
 1. Traffic Control.
 2. Sawcutting asphalt and/or concrete.
 3. Removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
 4. Dewatering.
 5. Excavation.
 6. Open Trench installation method (unless bid item specifies other method).

7. Pipe Bedding.
8. Backfilling and compacting native obtained from the excavation.
9. Supplying, hauling, backfilling and compacting granular material.
10. Loading, hauling and disposing of surplus excavated material.
11. Landscaping – turf establishment surface restoration and trees and bushes damaged during construction.
12. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.
13. Site access requirements including temporary aggregate material as required for local traffic access.
14. Bulkhead and abandoned existing water main with flowable fill as shown on Drawings.
15. 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.
16. Dust control.
17. Remove and replace existing mailboxes and traffic signs.
18. Restroom facilities.
19. Easement and right-of-way requirements.
20. Construction staking and other survey work not provided by the Engineer.
21. Regulatory requirements.
22. Preconstruction videotaping and video equipment.
23. Quality assurance and quality control testing and inspections.
24. Shop drawings and other submittals.

1.3 WATER MAINS (GRANULAR BACKFILL)

- A. The unit price for Water Main (Granular Backfill) work includes:
1. General Work Items of Article 1.2.
 2. Water pipe and fittings of material stated in the Unit Price Bid Schedule and installed using the open trench method.
 3. Ductile or cast iron fittings.
 4. Tracer wire.
 5. Polyethylene encasement of ductile iron or cast iron pipe and fittings.
 6. Blocking and joint restraints.
 7. Disinfection of pipelines.
- B. Measurement of payment will be the actual horizontal length along the centerline of the installed water main with no deductions for fittings and valves.
- C. The unit of measurement for payment is linear feet.

1.4 WATER MAINS (DIRECTIONAL DRILL)

- A. The unit price for Water Main (Directional Drill) work includes:
1. General Work Items of Article 1.2.
 2. Field verifies location and elevation of existing utilities before or during directional drilling.
 3. Boring pit and receiving pit excavation.

4. PVC pipe and materials (Fusible PVC or PVC and Certa-Lok Restraint).
5. Tracer wire.
6. Installation of the PVC pipe by directional drilling.
7. Backfilling and compacting the boring and receiving pits.
8. Loading, hauling and disposing of surplus excavated material.

B. Measurement of payment will be the actual horizontal length along the centerline of the installed water main with no deductions for fittings and valves.

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

1.5 WATER SERVICES

A. The unit price for Water Services work includes:

1. General Work Items of Article 1.2.
2. Pipe and fittings of material stated in the Unit Price Bid Schedule.
3. Tracer wire.
4. Disinfection of pipelines.
5. Install an 8'- 4"x4" board at the end of the lateral.

B. Measurement of payment will be the actual horizontal length along the centerline of the installed water service with no deductions for fittings and curb stops.

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

1.6 CORPORATION AND CURB STOPS

A. The unit price for Corporation and Curb Stops work includes:

1. General Work Items of Article 1.2.
2. Supply curb stops and curb boxes.
3. Connection to existing water service (where required).
4. Installation of curb stops and curb boxes.
5. Tracer wire.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.7 2" CORPORATION WITH PLUG/SADDLE AND HDPE

A. The unit price for 2" Corporation with Plug/Paddle and HDPE work includes:

1. General Work Items of Article 1.2.
2. Provide and install 2" corporation with plug (where required) with 2" HDPE pipe.
3. Provide and install 2" corporation with saddle (where required) with 2" HDPE pipe.
4. Remove 2" corporation with plug/saddle and repair water main.
5. Provide solid sleeve if saddle was removed.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.8 FIRE HYDRANTS

A. The unit price for Fire Hydrants work includes:

1. General Work Items of Article 1.2.
2. Fire hydrant complete of the specified bury depth.
3. Blocking and joint restraints.
4. Hydrant wrenches.
5. Hydrant markers.
6. Polyethylene encasement.
7. Drainage pit.
8. Disinfection of hydrant.
9. Tracer wire.
10. Tracer wire access box.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.9 HYDRANTS LEADS

A. The unit price for Hydrants Leads work includes:

1. General Work Items of Article 1.2.
2. Pipe and fittings of material stated in the Unit Price Bid Schedule.
3. Blocking and joint restraints.
4. Tracer wire.
5. Disinfection of pipeline.

B. Measurement for payment will be the actual horizontal length along the centerline of the installed from the centerline of the water main to the centerline of the hydrant with no deductions for fittings and valves.

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

1.10 VALVES

A. The unit price for Valves work includes:

1. General Work Items of Article 1.2.
2. Valve.
3. Valve box.
4. Polyethylene encasement.
5. Stem.
6. Bedding material.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.11 CONNECTIONS TO EXISTING WATER MAINS

A. The unit price for Connection to Existing Water Mains work includes:

1. General Work Items of Article 1.2.
2. Locating existing water main.
3. Connection to the end of existing pipe.
 - a. Remove existing plug.
 - b. Direct connection to end of existing pipe.
 - c. Transition fittings, if required.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.12 ABANDON / REMOVE WATER MAIN AND APPURTENANCES

A. The unit price for Abandon/Remove Water Main and Appurtenances work includes:

1. General Work Items of Article 1.2.
2. Excavating
3. Install bulkheads and abandon water line.
4. Removing existing water main where in conflict with other utilities.
5. Providing and placing flowable fill.
6. Backfilling and compacting.
7. Removal and disposal of appurtenances as shown on the Drawings.

B. Measurement for payment will not be made. This includes all of the project area.

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

1.13 ABANDON WATER SERVICE AT PVC WATER MAIN W/SOLID SLEEVE

A. The unit price for Abandon Water Service at PVC Water Main w/Solid Sleeve work includes:

1. General Work Items of Article 1.2.
2. Excavate to water main.
3. Disconnect water service
4. Remove corporation from main.
5. Install solid sleeve.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.14 HINGE COVERED BOX, NON-FREEZE BOXED GROUND HYDRANTS

- A. The unit price for Hinge Covered Box, Non-Freeze Boxed Ground Hydrants work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Supply appurtenances.
 - 3. Connection to existing water service.
 - 4. Installation drain stone.
 - 5. Tracer wire.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each.

1.15 WATER METER ASSEMBLY

- A. The unit price for Water Meter Assembly work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Excavating, backfilling, and compaction for the assembly.
 - 3. Constructing the foundation.
 - 4. Furnishing and installing all required materials including, fittings, connections, mounting hardware, sleeving, piping, valves, controller, backflow heads, wiring, quick coupler valves, and artificial rock with locking mechanism.
 - 5. Installation of water meter (Water meter to be provided City).
- B. Measurement of payment will be for the completed facility.
- C. The unit of measurement for payment is lump sum.

1.16 WATER MAIN OFFSET

- A. The unit price for Water Main Offset work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Ductile or cast iron fittings and PVC pipe.
 - 3. Tracer wire.
 - 4. Polyethylene encasement of ductile iron or cast iron pipe and fittings.
 - 5. Blocking and joint restraints.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is each and includes the pipe fittings from vertical bend to vertical bend at the offset location.

END OF SECTION

SECTION 01 22 04

MEASUREMENT AND PAYMENT STREET AND DRAINAGE CONSTRUCTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:	<u>Bid Item No.</u>
1. Clearing and Grubbing	SD-01
2. Topsoil and Unclassified Excavation	SD-02
3. Pulverized Asphaltic Concrete Pavement and Aggregate	SD-03
4. Salvage and Reuse Asphaltic Concrete Pavement and Aggregate	SD-04
5. Crushed Aggregate Base and Surface Course	SD-05
6. Asphaltic Concrete Pavement	SD-06, SD-07, SD-08, SD-09
7. Portland Cement Concrete Curb and Gutter	SD-10, SD-11, SD-12, SD-13, SD-14, SD-15
8. Portland Cement Concrete Pavement	SD-16, SD-17, SD-18
9. Portland Cement Concrete Driveway and Sidewalk	SD-19, SD-20, SD-21, SD-22, SD-23, SD-24, SD-25, SD-26, SD-27
10. Portland Cement Sidewalk (9” Depth)	SD-28
11. Deformed Reinforcement Bars	SD-29
12. Drilling Tie Bars and Dowel Bars	SD-30, SD-31
13. Detectable Warning Field Natural	SD-32
14. Landscaping – Topsoil, Seed, Fertilize, and Mulch	SD-33
15. Profile Cut Concrete Curb Head	SD-34
B. Unit Prices include:	
1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.	

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for street and drainage systems.**
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.**
 - 1. Traffic Control.
 - 2. Sawcutting asphalt and/or concrete.

3. Removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
4. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site.
5. Site access requirements including temporary aggregate material as required for local traffic access.
6. Dust control.
7. Remove and replace existing mailboxes and traffic signs.
8. Restroom facilities.
9. Construction staking and other survey work not provided by the Engineer.
10. Regulatory requirements.
11. Quality assurance and quality control testing and inspections.
12. Final casting and valve box adjustment.
13. Shop drawings and other submittals.

1.3 CLEARING AND GRUBBING

- A. The unit price for Clearing and Grubbing work includes:
1. General Work Items of Article 1.2.
 2. Cutting and disposing of trees, brush, windfalls, logs and other vegetation.
 3. Removing and disposing of roots, stumps, stubs, logs and other timber.
 4. Stripping and stockpiling topsoil.
- B. Measurement of payment will not be made.
- C. The unit of measurement for payment is lump sum.

1.4 TOPSOIL AND UNCLASSIFIED EXCAVATION

- A. The unit price for Topsoil and Unclassified Excavation work includes:
1. General Work Items of Article 1.2.
 2. Removal of topsoil to depth available.
 3. Hauling and stockpiling topsoil.
 4. Excavation to subgrades shown on the Drawings.
 5. Hauling of unclassified material.
 6. Placing unclassified material in fill areas to subgrades shown on the Drawings and the subgrade required for placement of topsoil.
 7. Compaction of subgrade and fill areas.
 8. Test rolling subgrade.
 9. Excavation of undercut areas for placing topsoil.
 10. Respreading topsoil to final grades shown on the Drawings.
 11. Disposal of surplus topsoil, unclassified material and unsuitable material.
 12. Preparation of disposal site and transportation of material over an Engineer approved haul route from the site including all loading and dumping of material.
 13. Finish grading.

- B. Measurement for Payment on this item will be made on the amount of material removed from the site for street construction on College Avenue, Front Street, James Street, and the alley. The amount will be calculated based on the following equation:
 - 1. Total volume of excavated material from the cross section end area volume of the existing surface to the subgrade as shown on the cross sections.
 - 2. Subtract the volume of material paid under the bid item “Pulverize and Reuse Asphaltic Concrete Pavement and Aggregate”.
 - 3. The remaining amount is what will be paid under Unclassified Excavation.
- C. The unit of measurement for payment is cubic yards.

1.5 PULVERIZE ASPHALTIC CONCRETE PAVEMENT AND AGGREGATE

- A. The unit price for Pulverize and Asphaltic Concrete Pavement and Aggregate work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Pulverizing asphaltic concrete pavement with crushed aggregate base course to a depth of 8-inches.
- B. Measurement of payment is actual area pulverized.
- C. The unit of measurement for payment is square yards.

1.6 SALVAGE AND REUSE ASPHALTIC CONCRETE PAVEMENT AND AGGREGATE

- A. The unit price for Pulverize and Reuse Asphaltic Concrete Pavement and Aggregate work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Removing and hauling pulverized material.
 - 3. Transporting, placing and grading material back onto roadway.
 - 4. Compacting.
- B. Measurement of pavement is actual material removed and reused. The volume will be measured by surveying the subgrade and placed material, calculating volume with the cross section end area. Sections will be at a maximum interval of 50 feet.
 - 1. Actual depth of material placed will be determined in the field by the Engineer.
- C. The unit measurement for payment is cubic yard.

1.7 CRUSHED AGGREGATE BASE AND SURFACE COURSE

- A. The unit price for Crushed Aggregate Base and Surface Course work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Aggregate material.
 - 3. Preparation of foundation.
 - 4. Placing and compacting to thickness and width shown on the Drawings or specified elsewhere.
 - 5. Maintenance until surface pavement is constructed.
 - 6. Preparation of crushed aggregate base for paving.

7. Adjustment of manholes and valve boxes to proposed finish road grade.

B. Measurement of payment will be the actual amount of material required and incorporated in the work verified by submitting to the Engineer delivery tickets provided with each load showing the weight measured on a certified scale, type of material, the date delivered and the project name. Aggregates in excess of seven percent (7%) total moisture determined based on the dry mass of the aggregates will have moisture content in excess of seven percent (7%) deducted from the measured weight.

C. The unit of measurement for payment is tons.

1.8 ASPHALTIC CONCRETE PAVEMENT

A. The unit price for Asphaltic Concrete Pavement work includes:

1. General Work Items of Article 1.2.
2. Asphaltic concrete mixture, tack coat and other required materials
3. Surface preparation.
4. Provide tack coat on base material.
5. Saw cutting and/or mill adjacent and abutting pavement surfaces.
6. Asphaltic concrete placement and compaction to thickness and width shown on the drawings or specified elsewhere.
7. Tack coat between asphaltic concrete courses and abutting pavements.

B. For items bid per ton, measurement for payment will be the actual amount of material required and incorporated in the work verified by submitting to the Engineer delivery tickets provided with each load showing the weight measured on a certified scale, type of material, the date delivered and the project name.

C. The Unit Price shall be adjusted for deficiencies for less than minimum density represented by the average lot density of five nuclear density tests of 750 tons of asphaltic concrete placed as shown in the following table:

<u>Density Deficiency-Percent of Unit Price for Payment</u>	
<u>% Lot Density Below Specified Minimum</u>	<u>WisDOT Mixes</u>
From 0.5-1.0 inclusive	98%
From 1.1-1.5 inclusive	95%
From 1.6-2.0 inclusive	91%
From 2.1-2.5 inclusive	85%
From 2.6-3.0 inclusive	70%
More than 3.0	0%

D. The unit of measurement for payment is tons.

E. For items bid per square yard, measurement of payment will be:

1. Width:
 - a. The width will not be greater than the maximum trench width at the surface which is greater of the pipe outside diameter plus twenty-four (24) inches or the distance from the surface to the top of the pipe embedment; or
 - b. If the surface removal and the replacement limits are shown on the drawings outside the maximum trench width, then the actual average width of the area will be measured.
2. The length will be the actual length measured longitudinally along the installed facility.
3. The depth will be the depth shown on the drawings or specified elsewhere with the following reduction in the Unit Price for deficiencies in required thickness:

Thickness Deficiency – Percent of Unit for Payment	
Deficiency in Thickness of Average of Four Core Samples	Percent of Unit Price for Payment
0.00 to 0.125 inches	100%
0.126 to 0.25 inches	85%
0.251 to 0.375 inches	70%
0.376 to 0.5 inches	55%
Greater than 0.5 inches	0%

F. The Unit Price shall be adjusted for deficiencies for less than minimum density represented by the average lot density of five nuclear density tests of 750 tons of asphaltic concrete placed as shown in the following table:

Density Deficiency-Percent of Unit Price for Payment	
% Lot Density Below Specified Minimum	WisDOT Mixes
From 0.5-1.0 inclusive	98%
From 1.1-1.5 inclusive	95%
From 1.6-2.0 inclusive	91%
From 2.1-2.5 inclusive	85%
From 2.6-3.0 inclusive	70%
More than 3.0	0%

G. The unit of measurement for payment is square yards.

1.9 PORTLAND CEMENT CONCRETE CURB AND GUTTER

A. The unit price for Portland Cement Concrete Curb and Gutter work includes:

1. General Work Items of Article 1.2.
2. Providing Portland cement concrete mixture of size shown in the drawings or specified elsewhere.
3. Providing expansion joints.
4. Providing curing.
5. Existing curb and gutter removal.
6. Subgrade preparation.
7. Provide crushed aggregate base.
8. Fine grading of subgrade.

9. Providing contraction joints.
10. Driveway entrances and handicap ramp entrances.
11. Adjustment of catch basin/inlets.
12. Finishing.
13. Protection.
14. Restoration behind the curb.

B. Measurement for payment will be along the flow line of the gutter and through inlets/catch basins.

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

1.10 PORTLAND CEMENT CONCRETE PAVEMENT

A. The unit price for Portland Cement Concrete Pavement work includes:

1. General Work Items of Article 1.2.
2. Furnish all labor, tools, equipment and services.
3. Providing Portland cement concrete mixture of thickness shown in the drawings or specified elsewhere.
4. Surface preparation.
5. Providing reinforcement including tie bars and dowel bars.
6. Drilling tie bars and dowel bars into existing pavement.
7. Joint sealing.
8. Providing curing.

9. Concrete sealing with linseed oil.
10. Fine grading of subgrade.
11. Providing expansion joints and contraction joints.
12. Adjustment of manholes, water valves, inlets/catch basin and other structures to finish grade.
13. Finishing.
14. Protection.

B. Measurement for payment will be length and width of areas paved. Concrete curb and gutter will be measured separately, regardless if the curb is installed with integral curb. Curb and gutter will be paid per linear foot for twenty-four (24) inch width. The width and length will be subtracted from the concrete pavement area if integral curb is constructed.

C. The unit of measurement for payment is square yard.

1.11 PORTLAND CEMENT CONCRETE DRIVEWAY AND SIDEWALK

A. The unit price for Portland Cement Concrete Sidewalk and Driveway work includes:

1. General Work Items of Article 1.2.
2. Providing Portland cement concrete mixture of thickness shown in the drawings or specified elsewhere.
3. Providing reinforcement.
4. Providing expansion joint.
5. Stamping (where required)

6. Providing curing.
7. Existing pavement removal.
8. Subgrade preparation.
9. Providing contraction joints.
10. Handicap ramps.
11. Sidewalk steps.
12. Saw cutting adjacent surfaces.
13. Finishing.
14. Protection.
15. Restoration.

B. Measurement for payment will be the average horizontal length and width of the concrete placed.

C. The unit of measurement for payment is square yards.

1.13 PORTLAND CEMENT CONCRETE SIDEWALK (9")

A. The unit price for Portland Cement Concrete Sidewalk and Driveway work includes:

1. General Work Items of Article 1.2.
2. Providing Portland cement concrete mixture as shown in the drawings or specified elsewhere at a 12" width.
3. Providing reinforcement.
4. Providing expansion joint.
5. Providing curing.
6. Existing pavement removal.
7. Subgrade preparation.
8. Providing contraction joints.
9. Saw cutting adjacent surfaces.
10. Finishing.
11. Protection.
12. Restoration.

B. Measurement for payment will be length installed.

- a. This item applies to the widened concrete sidewalk (9" width) being constructed around tree grates, landscaped area, and curb line as shown on the James Street plans

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

1.14 DEFORMED REINFORCEMENT BARS

A. The unit price for Deformed Reinforcement Bars work includes:

1. General Work Items of Article 1.2.
2. Supply and install two - #4 deformed reinforcement bars over all trenches that fall under any portion of the concrete curb and gutter, sidewalk, and driveway being constructed.

B. Measurement for payment will be the horizontal length of each bar installed.

1. This item applies to concrete curb and gutter, sidewalk, and driveway.
2. This item does not apply to concrete pavement and patches.

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

1.15 DRILLING TIE BARS

A. The unit price for Drilling Tie Bars work includes:

1. General Work Items of Article 1.2.
2. Providing and installing tie bars, including coating.
3. For drilling holes in concrete not placed under the contract.
4. For epoxying or driving.

B. Measurement for payment will be the actual number of bars installed.

1. This item applies to concrete curb and gutter, sidewalk, and driveway.
2. This item does not apply to concrete pavement and patches.

C. The unit of measurement for payment is each.

1.16 DETECTABLE WARNING FIELD NATURAL

A. The unit price for Detectable Warning Field Natural work includes:

1. General Work Items of Article 1.2.
2. Providing and installing Detectable Warning Field per ADA requirements.
3. Each detectable warning field shall be two (2) feet by four (4) feet.

B. Measurement for payment will be the actual number of detectable warning field installed.

C. The unit of measurement for payment is each.

1.17 LANDSCAPING- TOPSOIL, SEED, FERTILIZE AND MULCH

A. The unit price for Landscaping- Topsoil, Seed, Fertilize, and Mulch work includes:

1. General Work Items of Article 1.2.
2. Provide 4" topsoil or salvaged topsoil.
3. Provide seed.
4. Provide fertilizer.
5. Provide mulch.
6. Provide maintenance.

B. Measurement for payment will be the width and length not greater than the road right-of-way, not greater than the easement and not greater than fifteen (15) feet beyond the top of either side of ditches outside the right-of-way.

C. The unit of measurement for payment is square yard.

1.18 PROFILE CUT CONCRETE CURB HEAD

A. The unit price for Profile Cut Concrete Curb Head work includes:

1. General Work Items of Article 1.2.
2. Excavate behind concrete curb and gutter.

3. Profile cut curb head to create a mountable/driveway curb.
 4. Remove and dispose of curb head.
 5. Patch holes in concrete used for mounting saw rail.
- B. Measurement for payment will be along the flow line of the gutter.
- C. The unit of measurement for payment is linear feet.

END OF SECTION

SECTION 01 22 05

MEASUREMENT AND PAYMENT SPECIAL CONSTRUCTION

PART 1 – GENERAL

1.1 SUMMARY

	<u>Bid Item No.</u>
A. Section includes:	
1. Pipe Foundation Stabilization	SC-01
2. Inlet Protection Erosion Control	SC-02
3. Tracking Pad	SC-03
4. Adjusting Existing Structure Frame and Casting	SC-04, SC-05
5. Railing Repair	SC-06
6. Rectangular Rapid Flash Beacon	SC-07
7. Permanent Signing	SC-08, SC-09, SC-10, SC-11, SC-12, SC-13
8. Wind Wall Foundation and Installation	SC-14
9. Furniture and Landscape Amenities	SC-15, SC-16, SC-17, SC-18, SC-19, SC-20, SC-21
10. Salvage and Reinstall Furniture, Landscape Amenities, Signs	SC-22, SC-23, SC-24
11. Traffic Control	SC-25, SC-26
12. Pavement Marking Epoxy Arrows, Words, Symbols	SC-27
13. Pavement Marking Epoxy Lines	SC-28, SC-29, SC-30, SC-31, SC-32
14. Water Wall	AB-01
B. Unit Prices include:	
1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.	

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for special construction.
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
1. Traffic Control.
 2. Loading, hauling and disposing of surplus material.
 3. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.

4. Dust control.
5. Restroom facilities.
6. Construction staking and other survey work not provided by the Engineer.
7. Regulatory requirements.
8. Quality assurance and quality control testing and inspections.
9. Shop drawings and other submittals.

1.3 PIPE FOUNDATION STABILIZATION

A. The unit price for Pipe Foundation Stabilization work includes:

1. General Work Items of Article 1.2.
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 or A-8 aggregate material.
5. Loading, hauling and disposing of surplus excavated material.

B. Measurement of payment will be the volume calculated based on:

1. The actual depth from four (4) inches 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 twenty-four (24) inches plus 1:1 side slopes.
3. The top width is the pipe outside diameter plus twenty-four (24) inches.

C. The unit of measurement for payment is cubic yards.

1.4 INLET PROTECTION EROSION CONTROL

A. The unit price for Inlet Protection Erosion Control work includes:

1. General Work Items of Article 1.2.
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 actual number of inlet protection erosion control installed.

C. The unit of measurement for payment is each.

1.5 TRACKING PAD

A. The unit price for Tracking Pad work includes:

1. General Work Items of Article 1.2.
2. Install to the dimensions as shown on the drawing or specified elsewhere.
3. Providing filter fabric.
4. Providing crushed aggregate base course (3 inch clear stone).
5. Daily maintenance of aggregate.

6. Removal of aggregate and restore with topsoil, seed, fertilizer and mulch.

B. Measurement for payment will be the actual number of tracking pads installed.

C. The unit of measurement for payment is each.

1.6 ADJUST EXISTING STRUCTURE FRAME CASTING

A. The unit price for Adjusting Existing Structure Frame Casting work includes:

1. General Work Items of Article 1.2.
2. City of De Pere will provide structure castings if required. Contractor will pick up castings at 925 S. Sixth Street.
3. Removal of the casting and existing adjusting rings from the structure as required.
4. Providing concrete adjusting rings and a 2 inch rubber riser ring from the WisDOT approved product list.
5. Bituminous plastic cement sealing the exterior of the adjusting rings and casting.
6. The ring will be secured to the precast section with a 3 ½ inch wide Kent Seal or equal.
7. Above the concrete ring attach ¼ inch thru 3 inch thick ring using two ⁵/₁₆ inch bead above and below the ring of sealant type as recommended by the rubber manufacturer.
8. Initial and final adjustment.
9. Backfilling and compacting.

B. Measurement for payment will be the actual number of structure frame casting adjusted.

C. The unit of measurement for payment is each.

1.7 RAILING REPAIR

A. The unit price work for Railing Repair/Replacement work includes:

1. General Work Items of Article 1.2.
2. Unbolt and remove existing painted metal hand railing from locations shown on the plans or repair in the field.
3. Removal and disposal of unsalvageable hand railing by appropriate means.
4. Cutting or grinding off of excess or unsalvageable material and sandblasting existing hand railing
5. Providing new hand railing to replace unsalvageable portions.
6. Painting hand railing with primer coat and black powder coat.
7. Field welding of new railing to replace unsalvageable railing portions.
8. Bending of hand railing tubing to radius to match existing hand railing design in the field.
9. Installation of hand railing via anchor bolts into Portland cement concrete or installation of slots for hand railing to be installed into. Epoxy around installed railing posts to match existing.

B. Measurement for payment will not be made.

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

1.8 RECTANGULAR RAPID-FLASH BEACON

- A. The unit price for Rectangular Rapid-Flash Beacon work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Provide footings and appurtenances.
 - 3. Providing and installing all sign posts, sign bases and associated appurtenances.
 - 4. Providing and installing the rectangular rapid-flash sign assembly including reflective signs, flashing beacons, pedestrian push buttons, solar panels, communications, wiring, and associated appurtenances as recommended by the manufacturer.
 - 5. Restoration
- B. Measurement for payment will be each rectangular rapid-flash beacon installed.
- C. The unit of measurement for payment is each.

1.9 PERMANENT SIGNING

- A. The unit price for Permanent Signing work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Removing all signs and sign supports as shown in the details. Providing any granular backfill for any voids created.
 - 3. Moving all signs and sign supports as shown in the details.
 - 4. Providing and installing all wood posts as shown in the details, including providing box outs as shown in the plans and details. All wood post should be 4" x 6" with the appropriate lengths.
 - 5. Providing and installing all reflective signs as shown in the details.
 - 6. Conforming to Section 637 of Wisconsin Standard Specifications for Highway and Structure Construction Latest Edition.
 - 7. Restoration.
 - 8. Completed per the general notes on the exhibits.
- B. Measurement of payment will based on the actual number of signs installed.
- C. The unit of measurement for payment is per each.

1.10 WIND WALL FOUNDATION AND INSTALLATION

- A. The unit price for Wind Wall Foundation and Installation work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Excavating, backfilling, and compaction for the foundation.
 - 3. Constructing the foundation.
 - 4. Thickened concrete sidewalk at structure per detail.
 - 5. Hardware for the connection.
 - 6. Installation/connection of the wind wall (wind wall is being built by others).
- B. Measurement of payment will be for the completed facility.
- C. The unit of measurement for payment is lump sum.

1.11 FURNITURE AND LANDSCAPE AMENTIES

- A. The unit price for Furniture and Landscape Amenities work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing item as identified in the bid.
 - 3. Installation, including assembling, attaching to concrete (where applicable), and clean up.
 - 4. Lighting (where applicable)
 - 5. Installation of 3” of decorative stone mulch under the tree grate.
- B. Measurement of payment will be the actual number installed.
- C. The unit of measurement for payment is each.

1.12 SALVAGE AND REINSTALL FURNITURE, LANDSCAPE AMENTIES, SIGNS

- A. The unit price for Salvage and Reinstall Furniture, Landscape Amenities, Signs work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Removing and storing item as identified in the bid.
 - 3. Installation, including assembling, attaching to concrete (where applicable), and clean up.
 - 4. Concrete box-outs (where applicable).
 - 5. Touch-up painting any minor scratches.
- B. Measurement of payment will be the actual number installed.
- C. The unit of measurement for payment is each.

1.13 TRAFFIC CONTROL

- A. The unit price for Traffic Control work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing, installing, maintain, and removing the Traffic Control signing and barricades as shown on the plans and per the MUTCD.
 - 3. Traffic Detour, including covering signs when not in use.
 - 4. Flaggers per the MUTCD.
 - 5. Temporary traffic control signals (activated) per the MUTCD.
 - 6. Sidewalk closure.
- B. Measurement for payment will not be made.
 - 1. This item applies to the specific bid items lists. All other traffic control is incidental to other items bid.
- C. The unit of measurement for payment is for each location lump sum.

1.14 PAVEMENT MARKING EPOXY ARROWS, WORDS, SYMBOLS

- A. The unit price for Pavement Marking Epoxy Arrows, Words, Symbols includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing and installing the Pavement Marking Epoxy Arrows, Words, Symbols includes preparing the surface, including brush-off blasting of concrete, for providing all marking, including reflectorization with glass beads, for protecting marking until dry or cured, and for replacing marking improperly constructed or that fails during the warranty period.
 - 3. For remarking if initially applies at less than 90% of the specified rate.
- B. Measurement for payment will be by each individual unit.
- C. The unit of measurement for payment is each.

1.15 PAVEMENT MARKING EPOXY LINES

- A. The unit price for Pavement Marking Epoxy Lines includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing and installing the Pavement Marking Epoxy Lines includes preparing the surface, including brush-off blasting of concrete, for providing all marking, including reflectorization with glass beads, for protecting marking until dry or cured, and for replacing marking improperly constructed or that fails during the warranty period.
 - 3. For remarking if initially applies at less than 90% of the specified rate.
- B. Measurement for payment will be by the linear foot, calculated as follows:
 - 1. For solid lines; by adding the linear feet of solid line measured end to end.
 - 2. For intermittent lines; by multiplying the specified length of the individual marking of the line by the number of markings in the intermittent line end to end.
- C. The unit of measurement for payment is linear feet.

1.16 WATER WALL

- A. The unit price for Water Wall work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing all products for the Water Wall specified under Water Wall Sheets (F prefix) of the Plan Drawings and Section 13 12 13.
 - 3. Providing, hauling, placing, maintaining during construction.
 - 4. Excavating, backfilling, and compaction for the foundation and vault.
 - 5. Excavation, backfilling, and compaction of all piping and conduit for the water wall including
 - a. All piping, conduit, and electrical between the water wall and water wall vault.
 - b. Water servicing piping between the water wall vault and the water meter vault.
 - c. Conduit and electrical between the panel and water wall.
 - d. Conduit and electrical between the panel and water wall vault.
 - 6. Constructing the foundation.
 - 7. Thickened concrete sidewalk at structure per detail.

8. Documentation and equipment, including, but not limited to, water wall fountain, vault, glass panel, connection to foundation, vault, control panel, electrical conduit and wiring, motor/pump(s), venting, plumbing, valves, lighting (two integral water wall fixtures), trenching, and other facilities necessary for work, hardware for connection.
 9. Conduit, wiring, supports, and associated appurtenances
 10. Providing and installing the electrical wire and for making all connections.
 11. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.
- B. Measurement of payment will be for the completed facility.
1. This item does not include the sanitary lateral and wye.
 2. This item does not include the storm lateral.
- C. The unit of measurement for payment is lump sum.

END OF SECTION

SECTION 01 22 10

MEASUREMENT AND PAYMENT ELECTRICAL

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:	<u>Bid Item No.</u>
1. Upgrade Electrical Panel	E-01
2. Street Light	E-02
3. Concrete Bases	E-03
4. Light Fixture OB Including Concrete Base	E-04
5. Wire Connection To Fixtures	E-05, E-06, E-07
6. Conduit	E-08, E-09
7. Electrical Wire Lighting	E-10, E-11, E-12, E-13
8. Enclosure, NEMA 4	E-14
9. Branch Panel	E-15
10. In-Ground Box w/ Duplex Receptacles	E-16
11. Lighting Control Panel	E-17

B. Unit Prices include:

1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for electric and lighting systems.
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
 1. Traffic Control.
 2. Sawcutting asphalt and/or concrete.
 3. Removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
 4. Excavation/plowing
 5. Backfilling and compacting native obtained from the excavation.
 6. Supplying, hauling, backfilling and compacting granular material.
 7. Loading, hauling and disposing of surplus excavated material.

8. Landscaping – turf establishment surface restoration and trees and bushes damaged during construction.
9. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.
10. Restroom facilities.
11. Easement and right-of-way requirements.
12. Construction staking and other survey work not provided by the Engineer.
13. Regulatory requirements.
14. Preconstruction videotaping and video equipment.
15. Quality assurance and quality control testing and inspections.
16. Shop drawings and other submittals.

1.3 UPGRADE ELECTRIC PANEL

- A. The unit price for Upgrade Electric Panel work includes:
1. General Work Items of Article 1.2.
 2. Upgrade from 60 amp to 100 amp/3 phase breaker in existing panel.
 3. Hardware for connection to the concrete pad.
 4. Conduit, wiring, supports, and associated appurtenances.
 5. Balance the Panel A
- B. Measurement of payment will not be made.
- C. The unit of measurement for payment is lump sum.

1.4 STREET LIGHT

- A. The unit price for Street Light includes:
1. General Work Items of Article 1.2.
 2. Salvaging and storing existing street lights.
 3. Installing City supplied luminaires.
 4. Installing poles including grounding lugs and related mounting hardware.
 5. For hardware and fitting necessary to install the poles.
 6. For leveling shims, dampeners, and for corrosion protection.
- B. Measurement for payment will be the actual number installed.
- C. The unit of measurement for payment is by each.

1.5 CONCRETE BASES

- A. The unit price for Concrete Bases includes:
1. General Work Items of Article 1.2.
 2. Providing, installing, and protecting the concrete base.
 3. For embedded conduit and electrical components.
 4. For furnishing and installing anchor rods, nuts, washers, ground electrodes, connections, conduit and fittings.
 5. For bar steel reinforcement, if required.

6. For excavating, backfilling, and disposing of surplus materials, and restoring the site.

B. Measurement for payment will be as each individual base.

C. The unit of measurement for payment is by each.

1.6 LIGHT FIXTURE OB INCLUDING CONCRETE BASE

A. The unit price for Light Fixture OB Including Concrete Bases includes:

1. General Work Items of Article 1.2.
2. Providing, installing, and protecting the concrete base.
3. For embedded conduit and electrical components.
4. For furnishing and installing anchor rods, nuts, washers, ground electrodes, connections, conduit and fittings.
5. For bar steel reinforcement, if required.
6. For excavating, backfilling, and disposing of surplus materials, and restoring the site.
7. Furnishing and installing all required materials including light, weather covers, conduit boxes, fittings, and associated incidental items.
8. For excavating, backfilling, disposing of surplus materials, and restoring the site.
9. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.
10. Underground wiring shall be sized per load and code requirements.

B. Measurement for payment will be the actual number installed.

C. The unit of measurement for payment is by each.

1.7 WIRE CONNECTION TO FIXTURES

A. The unit price for Wire Connection to Fixtures includes:

1. General Work Items of Article 1.2.
2. Furnishing and installing all required materials including weather covers, conduit boxes, fittings, and associated incidental items.
3. For excavating, backfilling, disposing of surplus materials, and restoring the site.
4. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.
5. Underground wiring shall be sized per load and code requirements.

B. Measurement for payment will be for each connection.

C. The unit of measurement for payment is per each.

1.8 CONDUIT

A. The unit price for Electrical Wire includes:

1. General Work Items of Article 1.2.
2. Providing and installing conduit for electrical wire.
3. For providing all connectors.

B. Measurement for payment will be by the linear foot.

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

1.9 ELECTRICAL WIRE LIGHTING

A. The unit price for Electrical Wire Lighting includes:

1. General Work Items of Article 1.2.
2. Providing and installing the electrical wire and for making all connections.
3. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.
4. Verify all voltages drops does not exceed 3% and make sure connections meet local, state, and federal codes.
5. Underground wiring shall be sized per load and code requirements.

B. Measurement for payment will be by the linear foot, measured separately for each conductor.

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

1.10 ENCLOSURE, NEMA 4

A. The unit price for Electric Panel work includes:

1. General Work Items of Article 1.2.
2. Providing enclosure.
3. Hardware for connection.
4. Conduit, wiring, supports, and associated appurtenances.

B. Measurement of payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.11 BRANCH PANEL

A. The unit price for Branch Panel work includes:

1. General Work Items of Article 1.2.
2. Providing branch panel, Type NZ Load Center, 18-Space, 100 Amp MCB
3. Hardware for connection.
4. Conduit, wiring, supports, and associated appurtenances
5. Providing and installing the electrical wire and for making all connections.
6. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.

B. Measurement of payment will be the actual number installed.

C. The unit of measurement for payment is each.

1.12 IN-GROUND BOX WITH DUPLEX RECEPTACLES

- A. The unit price for In-Ground Box with Duplex Receptacles work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing in-ground box with duplex receptacles.
 - 3. Hardware for connection.
 - 4. Conduit, wiring, supports, and associated appurtenances
 - 5. Providing and installing the electrical wire and for making all connections.
 - 6. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.
- B. Measurement of payment will be the actual number installed.
- C. The unit of measurement for payment is each.

1.13 LIGHTING CONTROL PANEL, 8-RELAY

- A. The unit price for In-Ground Box with Duplex Receptacles work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Providing lighting control panel, 8-relay.
 - 3. Hardware for connection.
 - 4. Conduit, wiring, supports, and associated appurtenances
 - 5. Providing and installing the electrical wire and for making all connections.
 - 6. For providing all connectors, including wire nuts, fuses, fuse holders, splices, tape, insulating varnish or sealant, and for testing circuits.
- B. Measurement of payment will be the actual number installed.
- C. The unit of measurement for payment is each.

END OF SECTION

SECTION 01 22 11

MEASUREMENT AND PAYMENT LANDSCAPING

PART 1 – GENERAL

1.1 SUMMARY

- | A. Section includes: | <u>Bid Item No.</u> |
|-------------------------------------|--|
| 1. Backfill for Plant Bed | L-01 |
| 2. Trees | L-02, L-03 |
| 3. Shrubs | L-04, L-05, L-06,
L-07, L-08, L-09 |
| 4. Perennial Plants | L-10, L-11, L-12,
L-13, L-14, L-15,
L-16, L-17, L-18,
L-19, L-20, L-21,
L-22, L-23 |
| 5. Ornamental Grasses and Sedges | L-24, L-25, L-26,
L-27, L-28, L-29,
L-30, L-31 |
| 6. Spring Bulbs | L-32, L-33, L-34,
L-35 |
| 7. Tree Protection | L-36 |
| 8. Shredded Hardwood Mulch | L-37 |
| 9. Plant and Seed Maintenance Areas | L-38 |
- B. Unit Prices include:**
1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for street and drainage systems.**
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.**
1. Traffic Control.
 2. Excavation
 3. Soil amenities
 4. Provide and Install Planting Material as detailed in the plans.

5. Provide and installing perennial plants as show in the plan and complying with American Standard for Nursery Stock (ANSI Z60.1-2004) for type, shape, and height (if applicable).
6. Staking out location of the plantings for approval.
7. Restoration

1.3 BACKFILL FOR PLANT BED

- A. The unit price for Backfill for Plant Bed work includes:
1. General Work Items of Article 1.2.
 2. Excavation to subgrades shown on the Drawings (27" below final grade).
 3. Hauling of unclassified material.
 4. Placing planting mixture to 3" below final grades shown on the Drawings.
- B. Measurement of payment will be based on the computed volume by calculating the length and width at a 24" depth.
- C. The unit of measurement for payment is cubic yards

1.4 TREES

- A. The unit price for Trees work includes:
1. General Work Items of Article 1.2
 2. Providing, hauling, excavating and placement of identified tree types.
 3. Watering, trimming and fertilizing.
 4. Cleanup of planting areas and all incidental work related to tree installation not specifically included with other items.
- B. Measurement for payment will be the number installed.
- C. The unit of measurement for payment is each.

1.5 SHRUBS

- A. The unit price for Shrubs work includes:
1. General Work Items of Article 1.2
 2. Providing, hauling, excavating and placement of identified shrub types.
 3. Watering, trimming and fertilizing.
 4. Cleanup of planting areas, and all incidental work related to shrub installation not specifically included with other items.
- B. Measurement for payment will be the number installed.
- C. The unit of measurement for payment is each.

1.6 PERENNIAL PLANTS

- A. The unit price for Perennial Plants work includes:
 - 1. General Work Items of Article 1.2
 - 2. Providing, hauling, excavating and placement of identified perennial plant.
 - 3. Watering, trimming and fertilizing.
 - 4. Cleanup of planting areas, and all incidental work related to perennial installation not specifically included with other items.
- B. Measurement for payment will be the number installed.
- C. The unit of measurement for payment is each.

1.7 ORNAMENTAL GRASSES AND SEDGES

- A. The unit price for Ornamental Grasses and Sedges work includes:
 - 1. General Work Items of Article 1.2
 - 2. Providing, hauling, excavating and placement of identified ornamental grasses and sedges.
 - 3. Watering, trimming and fertilizing.
 - 4. Cleanup of planting areas, and all incidental work related to installation not specifically included with other items.
- B. Measurement for payment will be the number installed.
- C. The unit of measurement for payment is each.

1.8 SPRING BULBS

- A. The unit price for Spring Bulbs work includes:
 - 1. General Work Items of Article 1.2
 - 2. Providing, hauling, excavating and placement of identified spring bulbs.
 - 3. Watering, trimming and fertilizing.
 - 4. Cleanup of planting areas, and all incidental work related to installation not specifically included with other items.
- B. Measurement for payment will be the number installed.
- C. The unit of measurement for payment is each.

1.9 TREE PROTECTION

- A. The unit price for Tree Protection work includes:
 - 1. General Work Items of Article 1.2
 - 2. Providing and installing fence.
 - 3. Providing tools and equipment for cutting and securing of fence and posts.
 - 4. Avoiding protected areas
 - 5. Cleanup of work areas.
 - 6. Repair of unintended damages.

7. All incidental work related to installation not specifically included with other items.

B. Measurement for payment will be amount installed.

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

1.10 SHREDDED HARDWOOD MULCH

A. The unit price for Shredded Hardwood Mulch work includes:

1. General Work Items of Article 1.2
2. Providing, hauling, delivering and placing shredded hardwood mulch material
3. Providing all labor, tools and equipment for placement of shredded hardwood mulch.
4. Cleanup of mulch applied areas
5. All incidental work related to installation not specifically included with other items.

B. Measurement for payment will be the amount installed and based on the length and width.

C. The unit of measurement for payment is square feet.

1.11 PLANT AND SEED MAINTENANCE PERIODS

A. The unit price for Plant and Seed Maintenance Periods work includes:

1. General Work Items of Article 1.2
2. Maintaining plantings and seeds as identified on the Plant Schedule and Drawings.
3. Providing watering services, fertilizing services, plant replacement and re-seeding of areas where original plantings or seeding fails to achieve hardy and vigorous growth within specified timeframe (1-year from substantial completion).
4. Mowing of designated seeded grass areas.
5. Cleanup of planting areas and seeding areas, and all incidental work related to tree installation not specifically included with other items.

B. Measurement for payment will not be made.

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

END OF SECTION

SECTION 01 22 12

MEASUREMENT AND PAYMENT DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

- | | |
|------------------------------|--|
| A. Section includes: | <u>Bid Item No.</u> |
| 1. Foundation Demolition | D-03 |
| 2. Structure Removal | D-01, D-02, D-04,
D-06, D-07, D-08,
D-09, D-10 |
| 3. Surface Treatment Removal | D-05, D-11, D-12 |
| 4. Curb and Gutter Removal | D-13 |
| 5. Paint Removal | D-14 |
- B. Unit Prices include:
1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are 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.

1.2 GENERAL WORK ITEMS

- A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for demolition.
- B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
1. Traffic Control.
 2. Sawcutting asphalt and/or concrete.
 3. Removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces as shown on the drawings.
 4. Removing, hauling and disposal of foundations and structures as shown on the drawing.
 5. Dewatering.
 6. Excavation.
 7. Supplying, hauling, backfilling and compacting granular material.
 8. Loading, hauling and disposing of surplus excavated material.
 9. Landscaping – turf establishment surface restoration and trees and bushes damaged during construction.
 10. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.
 11. Site access requirements including temporary aggregate material as required for local traffic access.

12. Dust control.
13. Restroom facilities.
14. Easement and right-of-way requirements.

C. In general, this section does not include removal of items completed as part of other work or bid in other sections.

1.3 FOUNDATION DEMOLITION

A. The unit price for Foundation Demolition work includes:

1. General Work Items of Article 1.2.
2. Excavating, backfilling, and compaction.
3. Demolition of the foundation to the extent shown on the plans.
4. Bulkheading utility connections (if applicable)
5. Supplying, hauling, backfilling and compacting granular material.

B. Measurement of payment will not be made.

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

1.4 STRUCTURE REMOVAL

A. The unit price for Structure Removal work includes:

1. General Work Items of Article 1.2.
2. Excavating, backfilling, and compaction.
3. Removing the structure as bid.
4. Salvaging to City (if required in plans or specifications).
5. Salvaging decorative stone to City.
6. Bulkheading utility connections (if applicable).
7. Supplying, hauling, backfilling and compacting granular material.

B. Measurement of payment will be for the actual number removed.

C. The unit of measurement for payment is each.

1.5 SURFACE TREATMENT REMOVAL

A. The unit price for Surface Treatment Removal work includes:

1. General Work Items of Article 1.2.
2. Excavating, backfilling, and compaction.
3. Removing the surface as bid.
4. Salvage to owner (if required)

B. Measurement of payment will be the length and the width of the removal.

C. The unit of measurement for payment is square yards.

1.6 CURB AND GUTTER REMOVAL

- A. The unit price for Curb and Gutter Removal work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Excavating, backfilling, and compaction.
 - 3. Removing the curb as bid.
- B. Measurement for payment will be along the flow line of the gutter.
 - 1. This item applies only to the specific location listed in the bid item.
- C. The unit of measurement for payment is linear feet.

1.7 PAINT REMOVAL

- A. The unit price for Paint Removal work includes:
 - 1. General Work Items of Article 1.2.
 - 2. Sand blasting or painting over existing pavement marking.
- B. Measurement for payment will be along the length of the paint removed.
 - 1. This item applies only to the specific location listed in the bid item.
- C. The unit of measurement for payment is linear feet.

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes:

1. Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Unit Price work will be the Schedule of Values used as the basis for reviewing Applications for Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as recommended by the Engineer and approved by Owner.
- B. The date for each progress payment should be the 3rd Wednesday of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends the 4th Friday of the Month.
- C. 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.
- D. Application Preparation Procedures
 1. When requested by the Contractor, the Engineer will determine the actual quantities and classifications of Unit Price Work performed.
 - a. Preliminary determinations will be reviewed with the Contractor before completing Application for Payment.
 - b. Engineer will complete the Application for Payment based on Engineer's decision on actual quantities and classifications.
 - c. Engineer will submit three original copies of Application for Payment to Contractor for certification of all three original copies.
 - d. Contractor shall submit signed Application for payment to Owner for approval within time frame agreed to at the Preconstruction Conference.
 2. If payment is requested for materials and equipment not incorporated in the Work, then the following shall be submitted with the Application for Payment:
 - a. Evidence that materials and equipment are suitably stored at the site or at another location agreed to in writing.
 - b. A bill of sale, invoice, or other documentation warranting that the materials and equipment are free and clear of all liens.
 - c. Evidence that the materials and equipment are covered by property insurance.

3. Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor.
- E. 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.
- F. 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 (For Lump Sum Work).
 3. Contractor's construction schedule.
- G. 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 that claims have been settled.
 6. Final liquidated damages settlement statement.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 32 33

CONSTRUCTION PHOTOGRAPHS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Photographs for utility construction sites.

1.2 SUBMITTALS

- A. Submit electronic files of each photographic view within seven (7) days of taking photographs.

1.3 QUALITY ASSURANCE

- A. Photographs are to be submitted to the Engineer for approval prior to the start of construction.

PART 2 – PRODUCTS

PART 3 – EXECUTION

3.1 UTILITY AND STREET CONSTRUCTION SITES

- A. Prior to start of construction provide sufficient photographs to adequately show the existing facilities and conditions within and adjacent to the construction Site to serve as a guide for final restoration including:

1. Roads including shoulders and/or curb and gutter.
2. Sidewalks, parking areas, and driveways.
3. Utility structures.
4. Landscaping including signs, plantings, walls, fences, trees, shrubbery, etc.
5. Mailboxes.
6. Drainage facilities including culverts, inlets, ditches.
7. Building structures.

- B. During construction provide sufficient photographs (a minimum of one per 100 feet of installed utility) to adequately show construction means, methods, and Site conditions including:

1. Crossings of other utilities.
2. Exposure of existing structures.
3. Soil conditions.

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for submittals:
 - 1. Progress Schedule.
 - 2. Schedule of Shop Drawings and Sample Submittals.
 - 3. Shop Drawings.

- B. Failure to meet Submittal requirements to the satisfaction of the Engineer will constitute unsatisfactory performance of the work in accordance with the Contract Documents, therefore, the Engineer may recommend to the Owner that all or a portion of payments requested during the corresponding pay period be withheld until these requirements are met.

1.2 SUBMITTAL PROCEDURES

- A. Coordination: Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - 3. To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals.
 - a. Allow two weeks for initial submittal.
 - b. Allow two weeks for reprocessing each submittal.
 - c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the work to permit processing.

- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 - 1. Assign a reference number to each submittal and re-submittal.
 - 2. Provide a space approximately four (4) by five (5) inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 - 3. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Engineer.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.

- g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - 4. Each submittal shall be stamped by the Contractor indicating that submittal was reviewed for conformance with the Contract Documents. The Engineer will not accept unstamped submittals.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal to the Engineer. The Engineer will not accept submittals received from sources other than the Contractor.
- 1. On the transmittal, record relevant information and requests for Engineer action. On a form, or separate sheet, record deviations from Contract Document requirements, including variations, limitations, and justifications. Include Contractor's certification that information complies with Contract Document requirements.

1.3 CONTRACTOR'S PROGRESS SCHEDULE

- A. Prepare and submit to the Engineer within 10 (ten) days after the Effective Date of the Agreement, four copies of a preliminary progress schedule of the work activities from Notice to Proceed until Substantial Completion.
- 1. Provide sufficient detail of the work activities comprising the schedule to assure adequate planning and execution of the work, such that in the judgment 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 must be performed before the contract is considered complete.
 - 2. 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. Excavation and grading.
 - c. Asphalt and concrete placement sequence.
 - d. Restoration.
 - e. Construction of various segments of utilities.
 - f. Subcontractor's items of work.
 - g. Allowance for inclement weather.
 - h. Contract interfaces, date of Substantial Completion.
 - i. Interfacing and sequencing with existing facilities and utilities.
 - j. Sequencing of major construction activities.
 - k. Milestones and completion dates.
- B. Distribution: Following response to the initial submittal, print and distribute copies of the revised construction schedule to the Engineer, Subcontractors, and other parties required to comply with scheduled dates. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

- C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.
- D. Punch List: Prepare and submit to the Engineer within ten (10) days after substantial completion a detailed progress schedule for outstanding work and punch list items.

1.4 SCHEDULE OF SHOP DRAWINGS AND SAMPLE SUBMITTALS

- A. Submit four (4) hard copies or electronic copies of preliminary submittal schedule in accordance with the General Conditions of the Contract and as follows:
 - 1. Coordinate submittal schedule with the subcontractors, Schedule of Values, and of products as well as the Contractor's Progress Schedule.
 - 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of the subcontractor.
 - e. Description of the part of the work covered.
 - f. Scheduled date for the Engineer's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies of the revised construction schedule to the Engineer, Subcontractors, and other parties required to comply with scheduled dates. Post copies in the field office. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.5 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- B. Collect product data into a single submittal for each element of construction of system. Product data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
 - 1. Mark each copy to show actual product to be provided. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.

- d. Application of testing agency labels and seals.
- e. Notation of dimensions verified by field measurement.
- f. Notation of coordination requirements.

- C. Do not use shop drawings without an appropriate final stamp indicating action taken.
- D. Submittals: Submit four (4) copies of each required submittal. The Engineer will retain two (2) copies, and return the others to the Contractor marked with action taken and corrections or modifications required.
- E. Distribution: Furnish copies of reviewed submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms. Maintain one copy at the project site for reference.
1. Do not proceed with installation until a copy of the Shop drawing is in the Installer's possession.
 2. Do not permit use of unmarked copies of the Shop Drawing in connection with construction.

1.6 ENGINEER'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Engineer will review each submittal, mark to indicate action taken, and return promptly. The Engineer will stamp each submittal with a uniform action stamp. The Engineer will mark the stamp appropriately to indicate the action taken, as follows:
1. "No Exceptions Taken": The work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
 2. "Make Corrections Noted": The work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
 3. "Amend and Resubmit": Do not proceed with work covered by the submittal. Resubmit without delay. Do not use, or allow others to use, submittals marked "Amend and Resubmit" at the Project Site or elsewhere where work is in progress.
 4. "Rejected – See Remarks": Do not proceed with work covered by the submittal. Resubmit without delay. Do not use, or allow others to use, submittals marked "Rejected and Resubmit" at the Project Site or elsewhere where work is in progress.
- B. Unsolicited Submittals: The Engineer will return unsolicited submittals to the sender without action.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Underground Utilities.
 2. Property Monuments.
 3. Traffic Control.
 4. Permits for Project.

1.2 UNDERGROUND UTILITIES

- A. Under the provisions of Wisconsin Statutes, Section 182.0175, all contractors, subcontractors, and any firm or individual intending to do work on this Contract shall contact all utility firms in the affected area of construction a minimum of three (3) working days prior to beginning construction so that affected utilities will be located and marked.

1.3 PROPERTY MONUMENTS

- A. Protect iron pipe monuments from movement.
- B. The cost of replacement of any monuments moved or destroyed during construction shall be the Contractor's responsibility.
- C. Perpetuation of destroyed or moved monuments shall be performed in accordance with state statutes by a registered land surveyor.

1.4 TRAFFIC CONTROL

- A. Provide traffic control facilities including barricades, signs, lights, warning devices, pavement markings, flaggers, etc.
- B. 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.
- C. Maintain traffic control devices as required to properly safeguard the public travel through final completion, including during periods of suspension of work.

1.5 PERMITS FOR PROJECT

- A. The following permits are being obtained by the Owner:
1. WDNR – Water Main Extension
 2. WDNR – Sanitary Sewer Extension
 3. Brown County – George Street

Project 20-02
Street Reconstruction and Utility Relay

City of De Pere

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 70 00

CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Closeout procedures.
2. Starting of systems.
3. Demonstration and instructions.
4. Project record documents.
5. Operation and maintenance data.
6. Manual for equipment and systems.
7. Spare parts and maintenance products.
8. Examination.
9. Preparation.
10. Execution.
11. Cutting and patching.
12. Protecting installed construction.
13. Final cleaning.

B. Related Documents and Sections:

1. Applicable provisions of Division 00 shall govern all work under this Section.

1.2 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
6. Make final change-over of locks and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.

8. Perform final cleaning according to this Section.
- B. Substantial Completion Inspection:
1. When Contractor considers Work to be substantially complete, submit to Engineer:
 - a. Written certificate that Work, or designated portion, is substantially complete.
 - b. List of items to be completed or corrected (initial punch list).
 2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
 3. Should Engineer determine that Work is not substantially complete:
 - a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
 - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer inspection.
 4. When Engineer finds that Work is substantially complete, Engineer will:
 - a. Prepare Certificate of Substantial Completion on Section 00 65 16 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
 - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
 5. After Work is substantially complete, Contractor shall:
 - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
 - b. Complete Work listed for completion or correction within time period stipulated.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
1. When Contractor considers Work to be complete, submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been examined for compliance with Contract Documents.
 - c. Work has been completed according to Contract Documents.
 - d. Work is completed and ready for final inspection.
 2. Submittals: Submit following:
 - a. Final punch list indicating all items have been completed or corrected.
 - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
 - d. Accounting statement for final changes to Contract Sum.
 - e. Contractor's affidavit of payment of debts and claims.
 - f. Contractor affidavit of release of.
 - g. Consent of surety to final payment.
 3. Perform final cleaning for Contractor-soiled areas according to this Section.
- D. Final Completion Inspection:
1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.

2. Should Engineer consider Work to be incomplete or defective:
 - a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
 - b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.3 STARTING OF SYSTEMS

- A. Coordinate schedule for startup of various equipment and systems.
- B. Notify Engineer seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.
- G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.
- H. Submit a written report according to Division 01 – General Requirements that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.
- B. Video Recordings: Provide high-quality color video recordings of demonstration and instructional sessions. Engage commercial videographer to record sessions. Include classroom instructions, demonstrations, board diagrams, and other visual aids. Include menu navigation.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

- E. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at designated location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.5 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction as follows:
 - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
 - 2. Include locations of concealed elements of the Work.
 - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
 - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
 - 5. Identify and locate existing buried or concealed items encountered during Project.
 - 6. Measured depths of foundations in relation to finish first floor datum.
 - 7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 9. Field changes of dimension and detail.
 - 10. Details not on original Drawings.

- G. Submit marked-up paper copy documents to Engineer before Substantial Completion.
- H. Submit PDF electronic files of marked-up documents to Engineer before Substantial Completion.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit in PDF composite electronic indexed file.
- B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.
- C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.
- D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - g. Safety precautions to be taken when operating and maintaining or working near equipment.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop Drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties.

1.7 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.

- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes before Substantial Completion. Draft copy will be reviewed and returned after Substantial Completion, with Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes within ten days after final inspection.
- E. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.
- F. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- G. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.
- H. Include color-coded wiring diagrams as installed.
- I. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.
- J. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- K. Include servicing and lubrication schedule and list of lubricants required.
- L. Include manufacturer's printed operation and maintenance instructions.
- M. Include sequence of operation by controls manufacturer.
- N. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- O. Include control diagrams by controls manufacturer as installed.
- P. Include Contractor's coordination drawings with color-coded piping diagrams as installed.
- Q. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- R. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

- S. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.
- T. Additional Requirements: As specified in individual product Specification Sections.
- U. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
- B. Deliver to place in location as directed by Owner; obtain receipt prior to final payment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

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

3.3 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
 - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
 - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
 - 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Engineer for final decision.
- E. Allow for expansion of materials and building movement.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
 - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
 - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
 - 1. Refer questionable mounting heights choices to Engineer for final decision.
 - 2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.
- I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

- A. Employ skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight-exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and nonconforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

- D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products according to requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- J. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
 - 1. Employ experienced personnel or professional cleaning firm.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.
- C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.
- D. Clean filters of operating equipment.

- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean Site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Engineering Surveys Provided by the Engineer.
2. Engineering Surveys Provided by the Contractor.

1.2 SUBMITTALS

A. None

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 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 to be provided by the Engineer.**

3.2 ENGINEERING SURVEYS TO BE PROVIDED BY THE ENGINEER

A. General

1. Establish benchmarks for construction as shown on the drawings.
2. Establish control points as shown on the drawings.

B. Gravity Sewer Systems and Water Distribution 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. New Road Construction

1. Provide construction slope intercept stakes for horizontal and vertical alignment on each side of the road base on each cross section in the cross section sheets for requests received at least seventy-two (72) hours before the related work begins.
2. Provide construction reference stakes for subgrade at a minimum of fifty (50) foot intervals and maximum of one-hundred (100) foot intervals on tangents. Provide construction reference stakes for subgrade at twenty-five (25) foot intervals within vertical and horizontal curves. Provide a reference line stake at each location.
3. Provide construction reference stakes for top of crushed aggregate at a minimum of fifty (50) foot intervals and maximum of one-hundred (100) foot intervals on tangents. Provide construction reference stakes for top of crushed aggregate at twenty-five (25) foot intervals within vertical and horizontal curves. Provide a reference or centerline stake.

3.3 ENGINEERING 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. If moved or destroyed due to Contractor negligence, then replace in accordance with state requirements; some of which are referenced in the "Regulatory Requirements".
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, bench marks, 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 construction reference stakes at each pipe length.

C. New Road Construction

1. Provide additional construction reference stakes necessary to establish location and grade in accordance with the plans.

END OF SECTION

SECTION 03 31 00

STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural Concrete.
2. Admixtures.
3. Curing and Treatment Requirements.
4. Formwork, shoring, bracing, and anchorage.
5. Concrete reinforcement and accessories.

B. Work Installed But Furnished Under Other Sections:

1. Division 05 – Metals: Metal fabrications attached to formwork.

C. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Division 31 – Earthwork.

1.2 REFERENCES

A. Incorporated Guides and References:

1. American Concrete Institute (ACI):
 - a. ACI 304R – Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - b. ACI 304.2R - Placing Concrete by Pumping Methods.
 - c. ACI 305R - Hot Weather Concreting.
 - d. ACI 309R – Guide for the Consolidation of Concrete.
 - e. ACI 347 – Guide to Formwork for Concrete.
 - f. ACI SP-66 – ACI Detailing Manual.

B. Specifications:

1. American Concrete Institute (ACI):
 - a. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
 - b. ACI 301 - Specifications for Structural Concrete.
 - c. ACI 303.1 – Specification for Cast-In-Place Architectural Concrete.
 - d. ACI 306.1 – Specification for Cold Weather Concreting.
 - e. ACI 308.1 – Specification for Curing Concrete.
 - f. ACI 315 - Details and Detailing of Concrete Reinforcement.
 - g. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
2. ASTM International (ASTM):
 - a. ASTM A184 – Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
 - b. ASTM A497 – Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

- c. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- d. ASTM A706 – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
- e. ASTM A775 – Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
- f. ASTM A1064 - Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- g. ASTM C33 – Standard Specification for Concrete Aggregates.
- h. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
- i. ASTM C150 – Standard Specification for Portland Cement.
- j. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
- k. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.
- l. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- m. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.
- n. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete.
- o. ASTM C989 – Standard Specification for Slag Cement for Use in Concrete and Mortars.
- p. ASTM C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- q. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete.
- r. ASTM C1240 – Standard Specification for Silica Fume Used in Cementitious Mixtures.
- s. ASTM C1602 – Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
- t. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- u. ASTM E1155 – Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.
- v. ASTM E1643 – Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- w. ASTM E1745 – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

1.3 SUBMITTALS

- A. Submit proposed mix design of each class of concrete to Engineer not later than 10 days after Notice to Proceed or 15 days prior to the first concrete placement, whichever comes first.
- B. Submit shop drawings of reinforcing steel under provisions of Division 01 – General Requirements.
 - 1. Initial submittal of reinforcement shop drawings shall be complete. No partial submittals will be accepted.
 - 2. Indicate reinforcement sizes, spacings, locations and quantities of reinforcing steel, and wire reinforcement, bending and cutting schedules, splicing, supporting and spacing devices.
 - 3. Reinforcement placement shop drawings for foundations and walls shall conform to ACI SP-66 providing full wall elevations.

- C. Material Certificates: For each of the following, signed by the manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Waterstops.
 - 4. Curing compounds.
 - 5. Bonding agents.
 - 6. Vapor retarders.
- D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301, 305R, and 306.1.
- B. Maintain copy of ACI 301 on site.
- C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of local, state and federal rules and regulations applicable to Work and Project location.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Concreting
 - 1. Placement and curing of concrete where (1) average daily temperature for three consecutive days is less than 40 degrees F, and (2) air temperature is not greater than 50 degrees F for more than one-half of a 24-hour period from midnight to midnight shall be in accordance with ACI 306.1.
- B. Hot Weather Concreting
 - 1. Placement and curing of concrete subject to a combination of (1) rising air temperature (generally greater than 75 degrees (F) and (2) wind and low relative humidity shall be in accordance with ACI 305R.
 - 2. Contractor shall provide plan for minimizing exposure of concrete to adverse conditions due to combinations of high air temperature, direct sunlight, drying winds, and high concrete temperature.
 - 3. Protect concrete from rapid temperature drop.
 - 4. Pre-wet subgrade and forms.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Plywood Forms: Douglas Fir or Spruce-Pine-Fir species: Sound, undamaged sheets with clean true edges, exterior glue, facing material to provide finish specified.
- B. Lumber: Douglas Fir or Spruce species; construction grade or better; with grade stamp clearly visible.
- C. Preformed Steel Wall Forms: Minimum 16 gage thick, Vertically and horizontally matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and surface appearance.
- D. Tubular Column Type: Round, spirally wound laminated fiber material; inside surface treated with release agent.
- E. Form Ties For Exposed Surfaces: Plastic cone snap ties with 1-inch outside diameter by 1-inch (nominal) long cones, with no metal within 1-inch of concrete face after removal;
 - 1. Manufacturers:
 - a. [Advance Concrete Formwork, Inc.](#)
 - b. [Dayton Superior.](#)
 - c. [Symons - A Dayton Superior Company.](#)
 - d. [Williams Form Engineering Corporation.](#)
 - e. Substitutions: As approved by Engineer.
- F. Form Ties For Hidden Surfaces: Metal spreader type, removable to a depth of 1-inch from concrete face;
 - 1. Manufacturers:
 - a. [Advance Concrete Formwork, Inc.](#)
 - b. [Dayton Superior.](#)
 - c. [Williams Form Engineering Corporation.](#)
 - d. Substitutions: As approved by Engineer.
 - 2. Contractor shall use formwork, form components and accessories provided by a single manufacturer. Intermixing of formwork, components and accessories shall not be allowed.

2.2 REINFORCING STEEL

- A. Reinforcing Steel: ASTM A615, 60 ksi yield grade carbon steel deformed bars; uncoated finish. Reinforcing bars to be welded shall conform to ASTM A706.
- B. Welded Steel Wire Reinforcement: Plain type, ASTM A1064; in flat sheets; uncoated finish.
- C. Reinforcement Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete.

2.3 FIBER REINFORCEMENT

- A. Synthetic Macro Fibers: Synthetic macro fibers engineered and designed for use in concrete, complying with ASTM C1116, Type III.
1. Manufacturers – Macro Fibers:
 - a. [The Euclid Chemical Company - TUF-STRAND SF](#)
 - b. [Propex Concrete Systems Corporation - Fibermesh 650](#)
 - c. [W. R. Grace & Co., Construction Products Division - STRUX 90/40](#)
 - d. Substitutions: As approved by Engineer.

2.4 CONCRETE MATERIALS

- A. Cementitious Materials
1. Portland Cement: ASTM C150, gray color, Type I or II except as specified below.
 2. Fly Ash: ASTM C618, Class C.
 3. Ground Granulated Blast Furnace Slag: ASTM C989, Grade 100 or 120.
 4. Silica Fume: ASTM C1240.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: ASTM C1602, clean and not detrimental to concrete.

2.5 ADMIXTURES

- A. Admixtures to be used in the concrete mixture shall be submitted to the Engineer for approval as part of the mixture design.
- B. Chemical admixtures shall be in accordance with ASTM C494.
- C. Admixtures shall be used in accordance with manufacturer's written recommendations.
- D. Admixtures containing chlorides, sulfides, or nitrides are not permitted.
- E. Admixtures permitted shall be supplied by a single manufacturer for project.
- F. Air Entrainment Admixture: ASTM C260;
1. Manufacturers:
 - a. [Axim Italcementi Group](#).
 - b. [BASF Admixtures, Inc.](#)
 - c. [Grace Construction Products](#).
 - d. [The Euclid Chemical Company](#).
 - e. Substitutions: As approved by Engineer.

2.6 ACCESSORIES

- A. Non-Shrink Grout: Premixed compound with non-metallic aggregate, cement, water reducing and plasticizing agents; capable of minimum compressive strength of 2400 psi.

- B. Joint Filler: ASTM D1751, Bituminous fiber, 1/2-inch wide by depth of concrete less 1/8-inch.
- C. Form Release Agent: Colorless material which will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating, intended for use on concrete;
 - 1. Manufacturers:
 - a. [BASF Construction Chemicals, LLC - Building Systems: Castoff.](#)
 - b. [Dayton Superior - Clean Strip Ultra \(J-3\).](#)
 - c. [W.R. Meadows - Duogard.](#)
 - d. Substitutions: As approved by Engineer.

2.7 CURING AND TREATMENT MATERIALS

- A. Water: Potable and clean.
- B. Polyethylene Film: ASTM C171, 6 mil thick, clear.
- C. Burlap shall be clean, evenly woven, free of encrusted concrete or other contaminating materials, and shall be reasonably free of cuts, tears, broken or missing areas.

2.8 CONCRETE MIXTURE

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture of field test data, or both, according to ACI 301.
- B. Mix concrete in accordance with ASTM C94.
- C. Concrete mix designs shall be designed and submitted in accordance with Division 01 and included as part of cost of this Work.
- D. Mix designs shall be prepared by a qualified agency acceptable to Engineer. Electronic copies of mix designs shall be submitted for Engineer's review prior to placing any concrete.
- E. Mix design shall indicate brands, types, and quantities of admixtures included, compressive strength, slump, sieve analysis for fine and coarse aggregate, quantities of all ingredients, type and brand of cement, source of aggregate, whether fine aggregate is natural or manufactured.
- F. Design of mix shall assure placing and finishing characteristics that meet Project requirements.
- G. Mix designs contained in the Schedule of Mixes may be modified and submitted to Engineer for approval, by use of mid or high range water reducing admixtures to control slumps required for pumping of concrete. Strength, placing and finishing requirements shall be maintained.
- H. Concrete mixtures placed directly over vapor retarders shall be designed to have low shrinkage characteristics and designed to minimize slab curling.
- I. Initial and final set times of concrete mix designs shall be coordinated between the contractor and concrete supplier.

2.9 SCHEDULE OF MIXES

- A. Exterior Foundations: Proportion normal-weight concrete mix as follows:
1. Compressive Strength (28 Days): 4000 psi.
 2. Maximum Aggregate Size: 3/4 - inch.
 3. Maximum Slump (Inch): 3
 4. Maximum Water-Cement Ratio: 0.50.
 5. Air Entrainment: 6 percent air content is required with an acceptable air content of plus or minus 1.5 percent.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits stated below.
- C. Verify lines, levels, and measurement before proceeding with formwork.
- D. Earth forms are not permitted.
- E. Align form joints.
- F. Do not apply form release agent where concrete surfaces receive special finishes or applied coatings which may be affected by agent.
- G. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.
- H. Provide chamfer strips for all exposed concrete corners of formwork.

3.2 REINFORCEMENT

- A. Place, support, and secure reinforcement against displacement.
- B. Locate reinforcing splices as shown on Drawings.
- C. Damage to rebar coating as a result of bending shall be repaired with equivalent coating.

3.3 PLACING CONCRETE

- A. Notify Engineer a minimum of 48 hours prior to commencement of concreting operations.
- B. Failure to notify Engineer may result in rejection of concrete placed without observation.

- C. Place concrete in accordance with ACI 301.
- D. Place pumped concrete in accordance with ACI 304.2R. Line coating mix to initiate pumping shall not be used in pour but shall be wasted.
- E. Ensure reinforcement and embedded items are not disturbed during concrete placement.
- F. Concrete with excessive honeycomb or embedded debris shall be rejected and replaced at no cost to Owner.
- G. Application of surface retarders and sawcutting of joints shall be planned in advance.
- H. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury.
- I. Placing During Hot Weather:
 - 1. Place concrete during hot weather conditions in accordance with ACI 305R.
- J. Placing During Cold Weather:
 - 1. Place concrete during cold weather conditions in accordance with ACI 306.1.
- K. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.4 CURING AND TREATMENT

- A. Curing shall begin promptly to prevent drying of concrete. Curing shall continue for seven (7) days after placing.
- B. Provide a moist cure for a full seven (7) days in accordance with ACI 308.1. Keep concrete continuously wet for a 7-day period. Intermittent wetting is not acceptable. Material shall completely cover the concrete surface and shall be weighted down to prevent shifting due to wind or other factors.
- C. Do not allow concrete to cool rapidly.

3.5 REPAIR OF VERTICAL SURFACE DEFECTS

- A. Upon stripping of forms, vertical surfaces shall be inspected for defects caused by surface air voids, honeycombing, form tie holes, peeling, and fins.
- B. Surface air voids shall be repaired with a unit packaged mixture of sand and cement mixed on job site with water and a unit of acrylic. Mixture shall be brushed uniformly on to surface and into voids. Where surface is to be exposed, surface finish of repair shall match adjacent surface.
- C. Honeycombed and other defective concrete shall be removed down to sound concrete and patched to match adjacent surfaces.

- D. Form tie holes shall be filled with non-shrink grout. Surface of concrete to prepare per recommendations by manufacturer. Grout shall be cured per recommendations by manufacturer.

3.6 FINISHING OF FORMED SURFACES

- A. After removal of forms and repair of defects, surfaces of concrete shall be given finishes specified below.
- B. Rough Form Finish: Surface left with texture imparted by forms; form facing material not specified; tie holes and defects shall be patched; fins exceeding 1/4-inch shall be chipped or rubbed off.
- C. Smooth Form Finish: Surface produced by form facing material shall be a smooth, hard, uniform texture on concrete; forms may be plywood, tempered form grade hardboard, metal, plastic, paper or other acceptable material capable of producing finish; arrangement of facing material shall be orderly and symmetrical with number of seams kept to practical minimum; forms supported to prevent deflection and to maintain tolerances; tie holes and defects shall be patched; all fins shall be removed.
 - 1. Smooth Rubbed Finish: produced on newly hardened concrete no later than day following form removal and after defects repaired; surface wetted and rubbed with carborundum brick or other abrasive until uniform color and texture are produced; no cement grout used other than cement paste drawn from concrete itself by rubbing process.
- D. Tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed and shall be floated to a texture reasonably consistent with that of formed surface.
- E. Final finish on formed surfaces shall continue uniformly across unformed surfaces.
- F. Where a schedule of finishes is not included in this Section, or finishes are not shown on Drawings, the following finishes shall be used as applicable: Rough Form Finish for all concrete surfaces not exposed to public view; Smooth Form Finish with Smooth Rubbed Finish for all concrete surfaces exposed to public view.

3.7 TOLERANCES

- A. All tolerances for concrete work shall be in accordance with ACI 117.

3.8 FIELD QUALITY CONTROL

- A. Testing and analysis of concrete shall be performed under provisions of Division 01 – General Requirements.
- B. Contractor will cast test cylinders and perform slump and air entrainment tests in accordance with ACI 301.
- C. Three concrete test cylinders shall be cast from each increment of 100 cubic yards of each class of concrete placed each day or from each placement of each class if less than 100 cubic yards.

- D. During hot or cold weather, as defined in Section 1.6, one additional test cylinder shall be cast from each increment of 100 cubic yards of each class of concrete placed each day or from each pour of each class if less than 100 cubic yards and be cured on site under same conditions as concrete it represents.
- E. One slump test will be taken for each set of tests cylinders cast and whenever consistency of concrete appears to vary.
- F. No water may be added to the concrete at the site unless pre-approved in writing by the Engineer for that specific mix. If pre-approved, the mix ticket must state how much water may be added.

END OF SECTION

SECTION 03 35 33

STAMPED COLORED CONCRETE FINISHING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Constructing stamped colored concrete.

1.2 REFERENCES

- A. WisDOT Standard Specification for Highway and Structure Construction, Latest Edition.

1.3 SUBMITTALS

A. Design Mixes

1. Submit copies of the composition and strength testing results for design mix for each type of concrete.

B. Certificates

1. Manufacturer's certification of the curing compound.
2. Manufacturer's certification of evaporation retarders.
3. Manufacturer's certification of sealer with sure grip.

C. Samples

1. Provide all material samples needed for the required testing.

1.4 QUALITY ASSURANCE

- A. Independent testing will be completed by the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Concrete shall be in accordance with the Standard Specifications.

- B. The stamping pattern shall be Belgian Basket Weave used brick.

- C. The coloring admixture shall be WisDOT Red, conforming to Section 405 of the WisDOT Standard Specification for Highway and Structure Construction.

- D. The maximum amount of chert allowed shall be less than one percent (1.0%) by weight.

- E. The City of De Pere will provide three sets of six basic concrete stamping and patterning tools. The contractor shall provide other tools necessary to complete the work.

- F. Evaporation retarders: Waterborne monomolecular film forming manufactured for application to fresh concrete, Dayton Superior Day-Chem Sure Film J-74 or equal.
- G. Form Release Agent.
- H. AK-2 ACHRO KURE 1315 sealer with sharp grip added.
- I. Curing and sealing materials shall be compatible with colored concrete as recommended by the manufacturer.

PART 3 – EXECUTION

3.1 PLACING AND FINISHING CONCRETE

- A. Construct stamped colored concrete pavement in accordance with the standard specifications and as hereinafter provided. The coloring of the concrete shall be full depth color, not surface application
- B. The City of De Pere will provide the decorative stamping and patterning tools for stamping the concrete. The City has 21 rigid stamps and 3 flexible stamps. The stamps owned by the City are Belgian Basket Weave used brick. If the Contractor needs to purchase more stamps to perform the work, the additional stamps purchased shall be considered incidental to the stamped colored concrete. Return the concrete stamping and patterning tools to the City once work is complete. Return concrete stamping and patterning tools in good condition. If the concrete stamping and patterning tools are not returned to the City in good condition the contractor shall replace the stamping and patterning tools.
- C. Provide all other standard finishing tools for stamping the colored concrete.
- D. Colored concrete shall be produced in one (1) cubic yard increments. No ½ cubic yard loads will be accepted.
- E. Water/cement in mix design shall be consistent to maintain consistent color.
- F. Colored concrete mixes for the entire project shall be consistent. If the mix is started with High Early Strength then all colored concrete shall be provided as High Early Strength. Switching from regular colored concrete to High Early Strength colored concrete or High Early Strength colored concrete to regular colored concrete will not be allowed.
- G. Once pouring of the colored concrete on the project has begun, cement switching in the colored concrete will not be allowed because it will affect the color consistency of the colored concrete.
- H. Any additional water added to colored concrete once the truck is on site will be rejected.
- I. Blessing of the colored concrete pavement with water once concrete is in place will not be allowed. If water is added to the surface of the colored concrete surface once concrete is in place, the colored concrete will be rejected and will need to be removed.

- J. Evaporation reducers will be used throughout the construction of the colored concrete.
- K. Cover and protect adjacent construction and concrete from discoloration and spillage during placement of colored concrete, application of release agents, and sealers.
- L. Liquid release agent shall be uniformly applied onto the colored still plastic state concrete to provide clean release of imprinting tools from the concrete surface without lifting imprint or tearing concrete.
- M. While initially finished concrete is in plastic state, accurately align and place imprinting stamps. Monitor the setting up of the concrete. Once the concrete has set to the point it can be stamped the contractor shall begin stamping. Uniformly pound or press imprint tool into concrete to produce required pattern and depth of imprint on concrete surface. Remove platform tools immediately. Hand texture and stamp edges and surfaces unable to be imprinted by stamp mats. Touch up imperfections such as broken corners, double imprints and surface cracks.
- N. Stamp concrete consistently so that stamped concrete does not have a vertical elevation difference of ½ inch or depressions in concrete capable of causing ponding water or ice.
- O. For concrete hand stamp edges and surfaces that are unable to be imprinted by platform tools, use texture mats and single blade hand stamps to match platform tool stamping pattern. Finished imprinting shall match pre-construction mock-up.
- P. After concrete has been stamped and the sheen has left the surface of the colored concrete, the colored concrete shall be sealed with AK-2 ACHRO KURE 1315 with sharp grip added. Apply per manufacturer's recommendations. Two coats of seal shall be applied. Apply second coat after first coat has dried. Do not seal over blemishes or imperfections caused by rainfall or protection materials.
- Q. In general colored concrete must be protected from premature drying and excessive cold or hot temperatures. Apply evaporation retarders to concrete surfaces only if hot, dry, or windy conditions causing a moisture loss approaching 0.20lb./sq.ft. x h before and during initial finishing operations. Apply according to manufacturer's written instructions after placing and screeding and during initial floating operations.
- R. Protect the colored concrete from damage.
- S. Adjacent concrete that is discolored shall be removed and replaced to the approval of the engineer.

END OF SECTION

SECTION 03 35 33.1

COLORED CONCRETE FINISHING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Constructing colored concrete.

1.2 REFERENCES

- A. WisDOT Standard Specification for Highway and Structure Construction, Latest Edition.

1.3 SUBMITTALS

A. Design Mixes

1. Submit copies of the composition and strength testing results for design mix for each type of concrete.

B. Certificates

1. Manufacturer's certification of the curing compound.
2. Manufacturer's certification of evaporation retarders.
3. Manufacturer's certification of sealer.

C. Samples

1. Provide all material samples needed for the required testing.

1.4 QUALITY ASSURANCE

- A. Independent testing will be completed by the Contractor.

- B. A colored 5'x5' concrete 4-inch test panel must be approved prior to any colored concrete sidewalk is placed.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Concrete shall be in accordance with the Standard Specifications and Section 32 16 20.

- B. The coloring admixture shall be Charcoal (C-24 Scofield CHROMIX® P Admixture for Color-Conditioned® Concrete or approved equal), conforming to Section 405 of the WisDOT Standard Specification for Highway and Structure Construction.

- C. The maximum amount of chert allowed shall be less than one percent (1.0%) by weight.

- D. Evaporation retarders: Waterborne monomolecular film forming manufactured for application to fresh concrete, Dayton Superior Day-Chem Sure Film J-74 or approved equal.

- E. Form Release Agent.
- F. Scofield Cureseal 700 concrete sealer or approved other conforming to ASTM C-1315, Type 1.
- G. Curing and sealing materials shall be compatible with colored concrete as recommended by the manufacturer.

PART 3 – EXECUTION

3.1 PLACING AND FINISHING CONCRETE

- A. Construct colored concrete pavement in accordance with the standard specifications and as hereinafter provided. The coloring of the concrete shall be full depth color, not surface application
- B. Provide all standard finishing tools.
- C. Colored concrete shall be produced in one (1) cubic yard increments. No ½ cubic yard loads will be accepted.
- D. Water/cement in mix design shall be consistent to maintain consistent color.
- E. Colored concrete mixes for the entire project shall be consistent. If the mix is started with High Early Strength, then all colored concrete shall be provided as High Early Strength. Switching from regular colored concrete to High Early Strength colored concrete or High Early Strength colored concrete to regular colored concrete will not be allowed.
- F. Once pouring of the colored concrete on the project has begun, cement switching in the colored concrete will not be allowed because it will affect the color consistency of the colored concrete.
- G. Any additional water added to colored concrete once the truck is on site will be rejected.
- H. Blessing of the colored concrete pavement with water once concrete is in place will not be allowed. If water is added to the surface of the colored concrete surface once concrete is in place, the colored concrete will be rejected and will need to be removed.
- I. Evaporation reducers will be used throughout the construction of the colored concrete.
- J. Cover and protect adjacent construction and concrete from discoloration and spillage during placement of colored concrete, application of release agents, and sealers.
- K. Touch up imperfections such as broken corners, edges and surface cracks.
- L. After concrete has been (light) broomed and the sheen has left the surface of the colored concrete, the colored concrete shall be cured and sealed per manufacturer's recommendations. Two coats shall be applied, first curing coat within 24 hours of finishing and second sealing coat after 28 days and cleaning (adjust to manufacturer's recommendations for approved product). Do not seal over blemishes or imperfections caused by rainfall or protection materials.

- M. In general, colored concrete must be protected from premature drying and excessive cold or hot temperatures. Apply evaporation retarders to concrete surfaces only if hot, dry, or windy conditions causing a moisture loss approaching 0.20lb./sq.ft. x h before and during initial finishing operations. Apply according to manufacturer's written instructions after placing and screeding and during initial floating operations.
- N. Protect the colored concrete from damage.
- O. Adjacent concrete that is discolored shall be removed and replaced to the approval of the Engineer.

END OF SECTION

SECTION 05 52 00.1

STRUCTURAL STEEL RAILINGS

PART 1 – GENERAL

1.1 SUMMARY

A. This section describes providing railing fabricated from steel structural tubing.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO)

1. M 160 Standard Specification for General Requirements for Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use

B. American Society for Testing and Materials (ASTM)

1. A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. A385 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
3. A500 Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
4. A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

C. Steel Structures Painting Council

1. SSPC-SP1 – Solvent Cleaning
2. SSPC-SP 6/NACE No. 3 – Commercial Blast Cleaning
3. SSPC-SP16 – Brush-off Blast Cleaning of Non-Ferrous Metals

D. Wisconsin Department of Transportation Standard Specification for Highway and Bridge Construction, Latest Edition.

E. American Welding Society (AWS)

1. Structural Welding Code – Bridge Welding Code

1.3 SUBMITTALS

A. Submit shop drawings to the Engineer conforming to the contract plans and provide additional details, dimensions, computations, and other information necessary for completely fabricating and erecting the work. For painted railings, state the name of the paint manufacturer and product name.

1. Conform to Section 506 of the Wisconsin Department of Transportation Standard Specification for Highway and Bridge Construction, Latest Edition.

PART 2 – PRODUCTS

2.1 MATERIAL – GENERAL

- A. Furnish steel railing, except if furnishing railings for adjacent structures; use the same material and finish.
- B. Use galvanized steel nuts, bolts, anchor bolts, and washers for steel railings unless the plans show stainless steel.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Unless the plans provide otherwise, set anchor bolts during concrete placement. Locate to provide the correct railing alignment. Ensure that bolts do not project more than 3/8 inch beyond the nut after attaching the rail. If setting anchor bolts in holes drilled in concrete for combination or pedestrian railing, use adhesive anchors conforming to Section 502 of the Wisconsin Department of Transportation Standard Specification for Highway and Bridge Construction, Latest Edition.
- B. Shim to align each railing post and end base plat as the plans show.
- C. Galvanize, or galvanize and paint steel railings as the plans specify.
- D. Saw the members of the railing to length; do not shear. Grind welded joints to a smooth finish.
- E. Fabricate railings to meet the requirements of ASTM A385. After fabrication, blast clean assemblies per SSPC-SP6 and galvanize according to ASTM A123. Provide vent holes in members to facilitate galvanizing and provide drainage. Remove burrs at component edges, corners, and holes; and chamfer sharp edges before galvanizing. Condition thermal cut edges before blast cleaning by shallow grinding or other cleaning to remove hardened surface layer material. Remove steel defects according to AASHTO M 160 before blast cleaning. Remove lumps, projections, globules, and heavy deposits of galvanizing. Do not use water quenching; and do not use chromate or other passive treatments.
- F. Use a two coat paint system if painting after galvanizing as follows:
 - 1. Coat exterior surfaces of railing assemblies and inside of rail elements at field erection joints.
 - 2. Coat inside of rail elements at expansion joints.
- G. Clean galvanized surfaces before coating according to SSPC-SP1 to remove chlorides, sulfates, zinc salts, oil, dirt, organic matter, and other contaminants. Ensure tie-coat adhesion by brush blasting the cleaned surface according to SSPC-SP16 to create a slight angular surface profile according to manufacturer's recommendations of 1 mil to 1.5 mils. Remove wet storage stains before blasting according to SSPC-SP16.

- H. Brush blast at an angle of 30 to 60 degrees at no greater than 50 psi using garnet or other engineer approved soft abrasive. Do not use steel shot or angular iron blasting grit. Brush blast the surface to produce a matte silver appearance. Do not fracture the galvanizing finish or remove any dry film thickness. Before applying the tie-coat, remove visible deposits of oil, grease, and other contaminants according to SSPC-SP1 and remove dust, dirt, and loose residue.
- I. After cleaning and within 8 hours of blasting, apply the tie-coat from a coating system intended for galvanized surfaces, according to manufacturer's recommendations. Apply the top-coat according to manufacturer's recommendations, matching the color the plans show. Use a top-coat that is UV resistant and suitable to a marine environment. Ensure that the tie and top-coats are of contrasting color and come from the same manufacturer.
- J. Ensure that the coating manufacturer reviews the process for surface preparation and application of the coating system with the coating applicator. The review includes a visit to the facility performing the work if the coating manufacturer requests. Provide written confirmation, from the coating manufacturer to the Engineer, that the review took place and that issues raised were addressed before beginning coating work under the Contract.
- K. Any coating with bubbles, blisters or flaking will be rejected.
- L. Handle steel railings conforming to section 517 of the Wisconsin Department of Transportation Standard Specification for Highway and Bridge Construction, Latest Edition. Repair or replace railing assemblies if the zinc coating or the two-coat paint system is damaged. Store the material off the ground, providing proper ventilation and drainage. Do not field weld, field cut, or drill as specified in the plans and specifications.
- M. For minor damage to coated surfaces caused by shipping, handling or installation; touch-up the surface conforming to the manufacturer's recommendation for the two-coat paint system and conforming to ASTM A780 for the zinc coating.
- N. Weld railing as the plans show and conforming to AWS D1.5.

END OF SECTION

SECTION 12 93 00

SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Trash Receptacles.
2. Recycling Receptacles.
3. Benches with Backs.
4. Benches with internal LED Illumination.
5. 2-Top Table and Chairs.
6. Tree Grates.
7. Bollards.

B. Related Sections:

1. Applicable provisions of Section 00 70 00 – General Requirements shall govern Work under this Section.
2. Section 32 16 20 – Concrete Sidewalks.

1.2 REFERENCES

A. ASTM International (ASTM):

1. ASTM A48 – Specification for Gray Iron Castings.
2. ASTM A53 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A615 – Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
6. Standard Practice for Operating Salt Spray (Fog) Apparatus.
7. ASTM B580 - Anodic Oxide Coatings on Aluminum.
8. ASTM C33 – Specification for Concrete Aggregates.
9. ASTM C150 – Specification for Portland Cement.
10. ASTM C260 – Specification for Air-Entraining Admixtures for Concrete.
11. ASTM C979 – Specification for Pigments for Integrally Colored Concrete.
12. ASTM D454 – Test Method for Rubber Deterioration by Heat and Air Pressure.
13. ASTM D523 – Test Method for Specular Gloss.
14. ASTM D1760 - Pressure Treatment of Timber Products.
15. ASTM D2240 – Standard Test Method for Rubber Property—Durometer Hardness.
16. ASTM D2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
17. ASTM D2794 – Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
18. ASTM D3170 – Standard Test Method for Chipping Resistance of Coatings.
19. ASTM D3359 – Standard Test Methods for Measuring Adhesion by Tape Test.

20. ASTM D4060 – Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
21. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet.
22. ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
23. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Companies specializing in manufacture of outdoor furniture and equipment with minimum five (5) years experience.

1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 00 70 00 – General Requirements: Requirements for submittals.
- B. Provide in large-scale detail, drawings of fabricated equipment, type and gage of materials, hardware and fittings, with plan, front elevation, and a minimum of one cross-section.
- C. Submit manufacturer's installation instructions.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit maintenance data under provisions of Section 00 70 00 – General Requirements.

1.6 DELIVER, STORAGE, AND HANDLING

- A. Deliver, store and handle products to site under provisions of Section 00 70 00 – General Requirements.
- B. Lay panels and flat sections, flat and blocked, clear of ground in a manner to prevent warping, twisting, or sagging.
- C. Coordinate size of access and route to place of installation.

PART 2 - PRODUCTS

2.1 TRASH RECEPTACLES

- A. Manufacturer:
 1. Landscapeforms, contact Mike Konieczny at telephone (269) 337-1311.
 2. No substitutions.
- B. Model: Poe Litter Receptacle, side opening with lock and standard litter signage.
- C. Color: Black powdercoat.

2.2 RECYCLING RECEPTACLES

A. Manufacturer:

1. Landscapeforms, contact Mike Konieczny at telephone (269) 337-1311.
2. No substitutions.

B. Model: Poe Litter Receptacle, side opening 5-inch slot with lock and standard recycling signage.

C. Color: Black powdercoat.

2.3 BENCHES – WITH BACKS

A. Manufacturer:

1. Forms + Surfaces, contact Shawn Davidson at telephone (847) 636-6651.
2. No substitutions.

B. Model: SBVTR-72C-2E-3B, Vector Bench, 6 ft., with seat back, FSC 100 percent Cumaru slats, standalone, surface mount.

C. Color: Standard powdercoat, black texture.

2.4 BENCHES WITH INTERNAL LED ILLUMINATION

A. Manufacturer:

1. Forms + Surfaces, contact Shawn Davidson at telephone (847) 636-6651.
2. No substitutions.

B. Model: SBVTR-72C-2E-0B, Vector Bench, 6 ft., no seat backs, FSC 100 percent Cumaru slats, side panel with current pattern (vertical) at front of bench, stainless steel side panel with rainfall perforation pattern and satin finish, standalone, surface mount.

C. Color: Standard powdercoat, black texture.

2.5 2-TOP TABLE AND CHAIRS

A. Manufacturer:

1. Hauser Site Furniture, at telephone (800) 268-7328.
2. No substitutions.

B. Table Model: HS3636 Java Aluminum Slat Table, 36 inches square.

C. Chair Model: GS-4308-AL-MW1-WS3 Monterey Arm chair.

D. Color: Slate Black, Low Sheen Sandtex.

2.6 TREE GRATES

- A. Manufacturer:
 - 1. Ironsmith, contact Clay Edwards at Zenon Company; telephone number (847) 215-6050.
 - 2. No substitutions.
- B. Model: No. 9616, Market Street Tree Grate, 8 ft. x 8 ft., in quarter sections, 12-inch opening, tamper resistant screws, with two bolted light well covers per tree grate. Provide two Model TGL-SDF in grate light fixtures with shield, 3,000K LED MR-16 light and 20 degree beam spread. Refer to Electrical for more information.
- C. Finish: Supply grates in unfinished natural state.
- D. Provide matching steel angle frames model in accordance with installation detail. Frames to be provided unfinished.
- E. Each tree grate will have two lights.

2.7 BOLLARDS

- A. Manufacturer:
 - 1. JR Hoe and Sons
 - 2. Approved equals will be considered.
- B. Model: 150 GSF – 6” Bollard Iron Base Mounting
- C. Finish: Black

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use anchoring devices for materials encountered and usage expected.
- B. Install items in accordance with manufacturers' instructions, including site furnishings purchased by others.
- C. Coordinate with Owner’s Representative for delivery and installation of all site furnishings purchased by others.

3.2 TREE GRATE INSTALLATION

- A. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Refer to Electrical for more information on installation of the light fixtures.
- B. Restore damaged finishes and test for proper function. Clean and protect work from damage.

- C. Remove or protect tree grates if concrete or pavers around tree well perimeter are chemically treated, acid washed, or if water from new concrete will wash onto grates.
- D. Install grates where indicated on Drawings, flush and level with surrounding pavement surface.
- E. Install steel angle frame, in concrete flush and level with surrounding paving surface, maintain flush and leveled at all times. Frames must not slope in more than one direction.
- F. Use spreaders or stakes to keep frame from being distorted by concrete pressure, and clean concrete and debris from frame prior to tree grate installation.
- G. If needed, grind pads on underside of tree grates to level and prevent rocking.

3.3 ADJUSTING AND CLEANING

- A. Clean and adjust equipment to ensure proper working order and conditions.
- B. Remove masking or protective coverings from finished surfaces. Wash and clean equipment.

END OF SECTION

SECTION 13 12 13

EXTERIOR FOUNTAIN

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this Section includes all labor, materials, equipment, tools, incidentals, and services necessary to design, engineer, manufacture, supply, and install the Stationary Fountain with related mechanical and electrical systems complete including all components, hardware, and accessories as indicated on the Contract Drawing and specified herein:
 - 1. Discharge and suction piping systems.
 - 2. Electrical conduit and wiring systems.
 - 3. Subterranean Vault
 - 4. Mechanical and electrical equipment with components and accessories.
 - 5. Manufacture of primary fountain equipment and components is a “Basis of Design”.
 - 6. Include fountain system testing, adjustment, and operational training for Owner.
 - 7. Custom fabricated fixtures.

- B. Related Sections include the following:
 - 1. Division 01 – General Requirements
 - 2. Division 26 Section 26 00 00 “Basic Electrical Requirement”
 - 3. Division 26 Section 26 05 26 “Grounding and Bonding”
 - 4. Division 26 Section 26 56 00 “Exterior Lighting”

- C. Related Fountain System Work to be Provided by Other Separate Contractors:
 - 1. Concrete fountain basin reservoir.
 - 2. Paving systems.
 - 3. Earthwork including trench excavation and backfill.
 - 4. Stone Structure and Pedestal

1.2 REFERENCES AND STANDARDS

- A. General: As Specified in Division 1.

- B. “Rules Governing and Restricting the Use and Supply of Water”, City of Philadelphia, PA. Department of Environmental Protection, Bureau of Water and Sewer Operations, Division of Water Connections and Permits.

- C. Other Standards and References:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. American Water Works Association (AWWAA).
 - 3. American Public Works Association (APWA).
 - 4. American National Standards Institute, Inc. (ANSI).
 - 5. National Fire Protection Association (NFPA).
 - 6. Underwriters Laboratories, Inc. (UL).
 - 7. National Sanitation Foundation (NSF).

8. Department of Health (DOH).
9. National Electric Code (NEC).
10. American Society of Mechanical Engineers (ASME).
11. American Society of Sanitary Engineering (ASSE).
12. Commercial Standards (CS).
13. National Electrical Manufacturer's Association (NEMA).
14. Uniform Building Code (UBC).
15. Institute of Electrical and Electronic Engineers (IEEE).
16. Insulated Power Cable Engineers Association (IPCEA).
17. International Plumbing Code (IPC)

D. All work shall conform to the latest edition of the National Building Code and/or International Plumbing Code.

1.3 SYSTEM REQUIREMENTS

A. Design Requirements:

1. The fountain described in this Section shall be a fully automated, self- contained type stationary feature.

The work of this Section shall include design of equipment items for fabrication and installation of fountain equipment and components to suit Project requirements as approved by Owner. See Division 1 for additional provisions related to delegated design by Owner's Engineer.

B. Performance Requirements:

The fountain is a double sided waterwall feature. The structure is fabricated from type 304 stainless steel. The structure includes an integral stainless steel basin with the waterwall structure installed inside of the basin. The fountain shall operate at a minimum pumping rate of 120 g.p.m. to produce a continuous sheet of water on both sides of the glass. Lighting for the feature consists of Linear RGB color changing lights that are DMX controllable. The Wind Wall feature will include another set of the same lights that will be controlled from the fountain control panel so that the light displays will match in both features.

1.4 SUBMITTALS

A. General: Refer to and comply with Division 1 Section, for procedures and additional submittal criteria.

B. Installer Qualifications: Comply with Article "Quality Assurance" herein. Submit fountain system installer qualifications including resume and system identification of previous work experience on fountain systems of type indicated for Project and the following work:

1. Plumbing work.
2. Electrical work
3. Concrete and Waterproofing Work.
4. Other specific work; rock work, stainless steel, etc

C. Product Data:

1. Submit manufacturers' data for all equipment and individual components listed in "Part 2 – Products".
2. Submit a comprehensive electrical package to include a power diagram, logic diagram, process and instrumentation diagram, panel layout, component schedule, and cut sheets on all individual components in the control panel. The contractor shall furnish evidence that the building department has been contacted to assure local compliance and that any exceptions to local requirements or the National Electric Code have been addressed.
3. Submit for other items and materials of system not indicated in this Section including for items of conduit, wiring, electrical devices, piping and fittings, sealants and/or seals to confirm compatibility and conformance to Project wide requirements.

D. Shop Drawings: A concise plan, details, and section(s) shall accompany the submittal data on all components to assure compliance with the intended design as specified and shown on the Contract Drawings.

1. Include equipment and material handling instructions and interfacing requirements and coordination notes with other trades and contractors.
2. If family product data sheets are submitted for approval, cross out all items not appropriate and highlight the selections for the components to be submitted, include all options.

E. Samples for Verification: Submit for surface exposed elements of system as requested by Architect and highlight only the information that is pertinent.

F. Quality Control Submittals:

1. Test Reports: Fountain manufacturer's test report must be included in the control panel information package. This report shall include results of the test on both motors and all lighting circuits and uncommissioning report indicating proper operation.
2. Field Reports: The manufacturer shall provide a field test report in the controls package. This report, which includes information on the field voltage, current, and resistance at all components, must be filled out by the installing electrical contractor and submitted to the manufacturer and the Architect for approval.

G. Contract Closeout, Operations and Maintenance: Submit manuals pertaining to the operations and maintenance of the fountain system prior to final approval of system installation. The manuals shall include specification sheets, operations and maintenance data, exploded diagrams, replacement part lists, copies of field and test reports, and warranty information. Comply with Division 1.

1.5 QUALITY ASSURANCE

A. General:

1. Insofar as possible, all materials and equipment used in the installation of this work shall be of the same brand or manufacturer throughout for each class of material or equipment. The specification has allowed for substitutions; however, the substitution process will be strictly adhered to. If the process is incomplete, or not within the time frame, no substitutions will be considered. Substitutions will not be partially approved. If any item is not approved, the entire submittal will be rejected, not for resubmission. There will be no consideration for alternates,

- after the bid. Conform to Reference Standards and other Project Manual Sections as applicable.
2. Piping materials shall bear label, stamp, or other markings of specified testing agency.
 3. Use numbers of skilled workmen equal to work requirement or occasion. The skilled workman shall be thoroughly trained and experienced in the necessary crafts and shall be completely familiar with the specified requirements and methods needed for proper performance of the work in this Section.
- B. Fountain Manufacturer: The fountain equipment described in this section shall be supplied by Delta Fountains, Jacksonville, Florida, (800) 641-6675, Fax: (904) 886-9089 or approved equal. All other fountain manufacturers requesting approval must comply with the requirements listed in the SUBMITTALS section under the Product Data paragraph. All manufacturers' data on individual components listed in PART 2: Products, or pre-approved equals where allowed, shall be submitted to the Engineer, prior to approval. Manufacturers requesting prior approval shall submit to owner, at least 3 business days prior to the bid date, all data on all individual components listed in PART 2: Products, for review by the Engineer. All approvals will be issued in an addendum prior to the bid date.
- C. Installer's Qualifications: Plumbing and electrical work for fountain system installation shall be performed by firms with each having at least 5 years of successful commercial fountain installation experience on features similar to that required for the Project.
- D. Water feature contractor qualifications:
1. In entering into a contract covering this work, the Contractor accepts the specifications and drawings and guarantees that the work will be performed in accordance with the requirements of the specifications and drawings or such modifications to said specifications and drawings as may be made in the contract documents. The Contractor, in accepting the contract, has verified the design, and will perform such work as is required to achieve the design intent.
 2. The contractor shall currently be in the business of constructing custom water features and shall have a continuous 5 year record of no less than 5 successful projects of equal or greater scope.
 3. The Contractor further guarantees that the workmanship and material will be of the best quality procurable and that none but experienced workmen, familiar with each particular class of work, will be employed
 4. The Contractor further agrees to hold himself responsible for any defects which may develop in any part of the entire system, including equipment as provided for under this specification, due to faulty workmanship, design or material and to replace, make good, without cost to the Owner, any such faulty parts or construction which may develop at any time within one (1) year from the date of the final acceptance. Any repairs or replacements required because of defects, as outlined in this clause, are to be made promptly and approved in writing by the Engineer.
- E. Field Measurements: Verify dimensions with other work on Project which adjoins the equipment item(s) of this Section or to which work of this Section will be a part.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Fountain manufacturer shall adequately package all shipments to protect the material during shipment. Consolidate freight of like items when possible to ensure minimal shipments. All shipments to be freight on board, manufacturer's plant, with fully insured freight allowed to the jobsite.
- B. Handling and Unloading: All shipments shall be driver signed and counted to verify that all components listed on the packing slips are included in shipment prior to leaving the manufacturer's premise.
- C. Special Handling: Contractor to take necessary precautions in unloading, handling, moving, and storing all shipments, until it is installed in its final position, to protect all components from damage. Contractor to refer to all notes on the shop drawings for any additional instructions on handling fountain equipment.
- D. Acceptance at Site: Contractor to schedule and arrange for delivery of all shipments. Contractor is responsible for preparations of all equipment necessary to safely facilitate the unloading of all shipments and moving it to the final location. Freight is F.O.B plant, full freight allowed to jobsite. Contractor to account for all items in each shipment for accuracy before signing for acceptance of shipment. All damages and shortages shall be clearly documented on the Bill of Lading and packing slip before the delivery driver leaves the premises. The manufacturer shall be promptly notified within 24 hours of any and all documented damages and shortages. By signing the bill of lading, it is mutually agreed that the goods listed are accepted in apparent good order, condition and correct quantity, except as noted, and are in proper condition for transportation according to the applicable regulations of the department of transportation (for truck load shipments). In cases where shipments that are damaged in-transit and are signed for in good condition, it will be the contractor's responsibility to replace those damaged items. All shipments are subject to the manufacture's standard terms and conditions.
- E. Storage and Protection: Contractor shall store all components in their original packages and protect all items from damage until final placement occurs. Contractor shall rotate all motor shafts ¼ turn each and every month during storage up to the time of first performance to ensure motor shaft integrity.

1.7 WARRANTY

- A. Contractor and installer shall furnish warranty for fountain system installation for a minimum period of one year from date of Substantial Completion of the Contract as specified in Contract Conditions. Contractor shall include provisions of warranty to Owner not otherwise covered by manufacturer. Warranty to include the following:
 - 1. Fountain system to be free of defects of materials and workmanship.
 - 2. Fountain system performance to the designated water volumes, heights, patterns, and display features, as outlined in the design requirements in section 1.3(E)(3).
 - 3. Adjustments and/or corrections to warranted equipment shall be made at factory as per standard warranty terms.

- B. The manufacturer shall warrant all properly installed and maintained fountain equipment (except lamps) as provided in “Part 2 – Products” of this Section, free of defects in material and workmanship for a minimum period of 18 months from shipment or one year from 1st performance, whichever comes first. The fountain manufacturer, at their option, shall replace or repair any materials, components, or workmanship found to be defective within the warranty period when returned to the factory, freight pre-paid. No component may be returned for repair or replacement without an approved return materials authorization.
 - 1. Extended Warranties: Fountain manufacturer shall furnish to Owner any extended warranty that is standard and usually available from item manufacture/supplier for an item of equipment.

1.8 MAINTENANCE AND EXTRA MATERIALS

- A. Contractor shall supply chemical treatment materials of sufficient quantity, in addition to materials needed for system testing and adjustment, for use by Owner in maintenance of the system for a period of at least one month after Substantial Completion.
- B. Contractor shall supply any other special tools or parts that would be needed for Owner’s maintenance of the fountain system.
- C. Extra Materials – one additional replacement element is to be provided for all cartridge filters. Contractor to supply 30 day supply of chemicals

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Mechanical Components: The major mechanical components of the stationary fountain are as follows:
 - 1. DFFP-300, 3 Hp, Self-priming full-rated, NSF approved feature pump and fitted 2” FPT connections. The pump shall operate at a minimum of 120 GPM at 60’ TDH. Pump is one-piece case constructed with oversized basket strainer, double ring lock design lid for tool free access to removable basket strainer and pump internals. The pump shall have a floating eye seal between the closed impeller and diffuser for maximum efficiency. The motor shall be 120V, 1 phase, 3450 R.P.M and have a rust-proof stainless-steel shaft, and permanently lubricated, sealed bearings. Feature pump is pre-plumbed in equipment vault including all necessary check valves, isolation/flow control valves, true union type, as shown on the drawings.
 - 2. DFCF-200, 200 SQ. FT. Cartridge filter, heavy-duty abs constructed with cam & ramp lid for easy access to removable, washable filter media. Filter is pre-plumbed in equipment vault.
 - 3. DFBBF-65, 9 lb Automatic erosion type bromine feeder, heavy-duty abs constructed with integral check valve and proportioning valve. Feeder is pre-plumbed in equipment vault.
 - 4. DFWMUA-100, 1” water make-up assembly, type 304, schedule 40 stainless steel constructed with 110V, bronze, slow closing solenoid valve, water hammer arrestor and (3) 1” heavy-duty bronze constructed ball valves. The water make-up assembly is pre-plumbed in the equipment vault. PVC or copper construction is not acceptable. The contractor shall connect in-line on fresh water make-up line and provide back-flow preventer and/or reduced

pressure zone, and pressure reducing valve to ensure the incoming line pressure does not exceed 50 P.S.I.

5. Hammer Arrestor, ASSE 1010 certified, type L copper tube, HHPP piston with two lubricated EPDM O-rings, FDA approved lubricant, rolled piston stop, wrought copper male thread adapter. (manufacturer and product: Sioux Chief Mfg. Co., Inc., Series 650 and 660).
6. DFWLS-T, Transducer style water level sensor, min. type 316 stainless steel housing with isolated diaphragm sensors. The transducer is certified intrinsically safe, 4 to 20 mA outputs. The transducer is shipped complete with polyurethane jacketed shielded cable with polyethylene vent tube and Kevlar tension members, 200 lbs pull strength for use in a 5' depth tank. Conductors are 22 AWG. The length of the cable shall be no less than 150' and shall be verified by contractor if more is required to make home run to PLC without a junction.
7. DFJB-4, 4-Tap underwater junction box, cast bronze constructed with silicone gasket and (1) 3/4" bottom tap and (4) 1/2" side taps with machined brass cord seals and stainless steel hardware.
8. DFPN-075, 3/4" N.P.T. Schedule 40 stainless steel penetration nipple with integral water-stop flange. Red brass or P.V.C. will not be acceptable.
9. DFCC-50, 3/4" Machined brass cord seals with neoprene grommet, for water sensor cord.
10. DFPC-2123C, two part re-enterable potting compound for application in the junction boxes to provide watertight environment for electrical connections.
11. Stainless steel structure – The stainless steel waterwall structure and basin shall be fabricated from type 304 stainless steel. The basin shall be constructed of 1/4" thick material and have a mill finish. The Waterwall structure shall be constructed of 2" square tubing with glass supports and integral stainless steel box channels with the feature nozzles installed on 3" centers to produce the unbroken sheet of water as if flows down the glass. The nozzles shall be machined brass constructed with 1/2" bore and be angle adjustable to 12 degrees from vertical. The exterior stainless steel cladding shall be 1/8" thick material with finish to be specified by the Engineer. The basin shall include three 3" suction point connections with integral 6" x 6" antivortex plate. The basin shall also include a 3" drain connection and stainless steel anti-vortex plate; two 2" connections for water feed to the box channels; 1" inlet connection for the water make-up; two 1" connections for the lighting junction boxes and 3/4" connection for the transducer water level sensor. Stainless steel profile bar wire grating on 1/4" centers with supports 4" o.c. shall be included for installation in the basin after the installation of the glass panels. The glass panels are to be provided by the glass contractor.

B. Electrical Components: The major components to be included in the control panel and to be incorporated into a fully functional operating fountain system are specified and listed below:

GENERAL

1. The fountain control system shall be designed for 208 Volts, 3 phase, 4 wire service and shall operate (1) 3 Hp feature pump, (10) 6.2W/24VDC led lights, and appurtenances of the fountain. A Transducer style low water cut off system shall be provided to de-energize the control system during a low water level condition. The water level sensor shall also provide a separate water level control system to increase the water level before the low water cut off alarms in both operating and static environments.

2. NEMA 3R enclosure of galvanized steel construction, primed and phosphatized, finished with ANSI 49 gray baked on enamel, manufactured by Hoffman, equal to HCR series shall be provided. The enclosure shall have collar studs for sub-panel mounting, hasp and staple for padlocking, butterfly type stainless steel draw latches and hinged cover. All Hardware shall be stainless steel.
3. All components shall be mounted to a removable sub-panel. The sub-panel shall be fabricated from 14-gauge steel and shall be finished with baked on white enamel.
4. Service entrance lugs shall be provided, sized for 600 volts, 300-amp minimum. The power distribution block shall have a flammability rating of UL 94V-0, shall be based on NEC table using 75 degrees C wire and shall be equivalent to Square D class 9080.
5. A 600V lightning arrestor shall be provided and connected to the service entrance lugs for 3 phase power and 250V lightning arrestor for single phase power.
6. Motor starters for feature pump shall be IEC rated full voltage, non-reversing with thermal overload relay. Auxiliary contacts shall be provided as required for the specific control functions. Motor starters shall be as manufactured by Square 'D', Allen Bradley or pre-approved equal.
7. All 120 volt equipment shall be protected individually by thermal magnetic circuit breakers with an interrupting rating of 10KAIC @ 240 volt minimum. All circuit breakers shall be calibrated and sealed at the factory and shall be equivalent to Square D, type QOU.
8. The lighting and filter pump contactors shall be 30 amps rated and shall be equivalent to Omron type g72 or equal.
9. The fountain feature / filter pump, and lights shall be controlled by individual 24-hour time clock settings. The time clocks shall be electronic with 24-hour capabilities or shall be integral to the memory module or PLC.
10. The motor and lights shall be controlled by touch screen, designated "Hand - Off - Auto". In the "Hand" mode, the appropriate motor or set of lights shall be energized until the selection is placed in the "Off" mode. In the "Auto" mode, the appropriate motor shall be controlled by the appropriate time clock.
11. All power wiring shall be color coded using MTW #12 AWG minimum. Control wiring shall be MTW #14 AWG minimum and be numbered/lettered at each end. Wire numbers/letters shall be equivalent to Pass and Seymore "LeGrande".
12. All wiring shall be routed through a wiring duct system to provide wire protection and an organized appearance.
13. Terminals shall be provided for interface with field-installed equipment. The terminal blocks shall be mounted on a 30-degree angle for ease of field connection. Terminals shall be equivalent to Siemens, Allen Bradley, or Square D.
14. All components shall be labeled using a laser-screened Mylar nameplate. The nameplate shall be a laminated two-part system using black letters on a white background on the door and yellow background on the back panel providing protection against fading, peeling, or warping. The labeling system shall be computer controlled to provide logos, post-script type or custom design. The use of engraved plastic type tags is not acceptable.
15. The control system shall have complete drawings/schematics using AutoCAD. The drawing shall have a complete Bill of Materials, front panel view with component locations and electrical schematic. References to the Bill of Materials shall be located for each component.
16. The control system shall be designed and manufactured to meet all state and local codes, Underwriters Laboratories and the National Electric Code (particular attention to article 430 and 680)

17. The entire control system shall bear a UL 508 serialized label “Enclosed Industrial Control Panel”. The use of the UL label “industrial control panel enclosure” without the UL 508 serialized label is not acceptable. Additionally the control panel shall bear a UL label for “Industrial Control Panel for Permanently Attached Fountains”.
18. The low water cutout system shall provide intrinsically safe voltage to the transducer sensor. The sensor shall provide an input to the PLC to de-energize the pumps and motors. An adjustable time delay shall be provided to prevent nuisance tripping. the HMI shall indicate this alarm as well as provide time delay values for alarm and reset.
19. The water make up system shall provide intrinsically safe voltage to the transducer sensor. The sensor shall provide an input to the PLC to energize the water make up solenoid. An adjustable time delay shall be provided to prevent nuisance tripping. the HMI shall indicate this alarm as well as provide time delay values for alarm and reset. The water make-up shall operate on 2 set points for operating and static fill functions.

Programmable Logic Controller for Machine Logic Sequencing

A programmable logic controller shall control the fountain pumps. The PLC shall be an Allen Bradley Micrologix series, Siemens S71200 series, or pre-approved equivalent.

a. Mechanical features

- 1) Rugged, compact plastic housing;
- 2) Easily accessible connection elements and controls
- 3) Assembly on standard horizontal or vertical;
- 4) Terminal block as permanent wiring assembly.

b. Design features

- 1) Data integrity; the user program is the most important
- 2) Parameter settings are stored in the internal EEPROM.
- 3) Built-in DC 24V sensor/load power supply for the
- 4) Direct connection of sensors and actuators;
- 5) On-board digital input/outputs (CPU with 12 inputs and 12 outputs)
- 6) Interrupt points;
- 7) High-speed counters;
- 8) Easy expandability;
- 9) 2 high-frequency pulse outputs;
- 10) EEPROM 16K memory sub-module with real time clock.
- 11) Battery module for long-term back up.
- 12) Embedded web page for remote access and monitoring.

c. Functions

- 1) Fast instruction execution; Instruction execution times of ms or 0.8
- 2) Extensive instruction set; A large variety of basic operations such as binary logic, result assignment, save, count, time generation, load, transfer, compare, shift, rotate, complement generation, call subroutines, integrated communications instructions and other user-friendly functions such as pulse duration modulation, pulse train function, arithmetic functions, floating-point arithmetic, PID closed-loop control, jump functions, loop functions and code conversions serve to simplify programming.
- 3) Counting;
- 4) Interrupt handling;
- 5) Edge-controlled interrupts
- 6) Time-driven interrupts
- 7) Counter interrupts

- 8) Communications interrupts.
 - 9) Direct interrogation and driving of inputs and outputs;
 - 10) Password protection;
 - 11) Full access
 - 12) Read only
 - 13) Complete protection.
 - 14) Debugging and diagnostic functions.
 - 15) "Forcing" of inputs and outputs in debugging and diagnostic mode
- d. Communications: The built-in PPI (point-to-point interface) provides a range of communications features.
- 1) If the control panel drawings include remote communication, the avenue of connection through Ethernet via cat5 cable or WIFI will be installed by contractor. The communications capabilities can range from PLC upload/download, to full HMI, VFD, and PLC monitoring and control.

Programming: The PLC shall be supplied with a fully functional program that shall perform basic operations including time clock settings, pump/motor lockouts and water level control functions.

HMI (Human Machine Interface) – Touchscreen

The Siemens KTP400(700) (HMI) basic color touch screen is equipped with a 3.8(7") inch STN-display. A resolution of 480 x 272 800 x 480 pixels enables the representation of less complex operating screens. The panel can be operated by a resistive analog touch screen and additionally by 4 freely configurable function keys which – when actuated – provide tactile feedback. Allen Bradley, Square D or pre-approved equivalent.

The HMI shall be programmed to provide a minimum of user accessible screens. There shall be individual screens as applicable:

1. Main (providing access to all screens).
2. Feature Pump (includes Hand Off Auto, Run Status, Strainer/Low Level/Lockout Alarms).
3. Feature Pump Auto Set (includes 2-time clocks for multiple on/off selections).
4. Filter Pump (includes Hand Off Auto, Run Status, Strainer/Low Level/Lockout Alarms).
5. Filter Pump Auto Set (includes 1-time clock for multiple on/off selections).
6. Water Level (includes all level settings/timers, alarms).
7. Backwash (includes all Filter Backwash settings/timers).
8. Lights (includes Hand Off Auto, Color Status, Low Level/Lockout Alarms).
9. Lights Auto Set (includes 2-times clock for multiple on/off selections).
10. Wind (includes High Wind Lockout of Feature Pumps/ Low Wind Reset).
11. Status (a Quick screen shot of the Status of all Fountain Equipment).

2.2 INSTALLATION COMPONENTS

A. Piping Materials:

1. Unless architects specifications indicate otherwise, the suggested minimum piping and fitting standard recommended for this installation is Type 1.
2. All interconnecting piping and associated fittings, supplied by installing Contractor, shall be a minimum of Schedule 80 PVC, NSF-PW rated.

3. All welded PVC fittings above 6” diameter shall be fiberglass reinforced and used only on non-pressurized lines.
4. Use only clear PVC cleaner meeting NSF, UPC, and ASTM standards for cleaning and repairing PVC pipe and fitting surfaces for solvent cementing (IPS Corporation “Weld-On” Type C-65 or equivalent). Follow all directions and instructions appearing on product label.
5. Use only purple PVC primer meeting NSF, UPC, and ASTM #F-656 standards for softening and preparing field pipe and fitting surfaces for solvent cementing (IPS Corporation “Weld-On Type P-70 or equivalent). Follow all directions and instructions appearing on product label.
6. Use only clear or white, heavy bodied, medium setting PVC cement meeting NSF, UPC, and ASTM #D-2564 standards for solvent cementing PVC plastic pipe and fittings (IPS Corporation “Weld-On” Type 711 or equivalent). Follow all directions and instructions on product label.
7. Provide Link Seal for all penetrations in equipment room. All penetrations through outside walls to below grade shall be sealed per building specifications. Using “easy-link seals” is recommended
8. All piping penetrations through structure walls into open areas below pool structure must have the necessary allowances made for settlement.
9. Pipe hangers and supports per national plumbing code. All piping in open areas below the pools shall be installed free hanging from the ceiling in the level below with pipe hangers/per specifications and code
10. Reference requirements of other Project Manual Specifications for materials and items not specified herein.
11. Thrust Block for Piping Turns

B. Electrical Materials:

1. Rigid conduit shall be corrosion resistant and either galvanized steel or rigid PVC as specified in Part 3 Article “Basic Electrical Methods” herein. Submit Product Data and related specifications on materials to be used. All electrical conduit and conduit fittings between submersible light fixture niches, junction boxes and control panels will be U.L. listed rigid, nonmetallic, PVC NEMA, TC-2 max. 90°C, sunlight resistant for above and below ground use. All conduits shall be protected at all times from possible water ingress. Use only approved primer and PVS glue suitable for joining all PVC conduits and fittings per manufacturer’s instructions.
2. All conductors shall be copper with insulation suitable for the particular wiring location as specified in Part 3.4 Article “Basic Electrical Methods” herein. Submit Product Data and related specifications on materials to be used underwater.
3. Reference requirements of other Project Manual Specifications for materials and items not specified herein.
4. All PVC conduit connections underground shall be SCH40 pressure fittings ((FE) male adaptors and couplings). Use color coded primer, pressure fitting PVC glue, and Teflon paste. The use of normal electrical PVC fittings is prohibited.
5. All connections in the pool/fountain shall be made with the assistance of a plumber, using Teflon paste or Teflon tape to eliminate all leaks. Use only tapered (NPT) stainless steel fittings and nipples. The use of galvanized, black, brass or steel piping is prohibited.
6. All conduit connections between dissimilar metals must be made with dielectric fittings, and sealed with dielectric thread compound to prevent galvanic degradation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of existing elevations: Verify all joining elevations prior to laying pipe or setting pipe. Notify Fountain equipment manufacturer, Architect, and or Engineer of all discrepancies before proceeding with the construction of the fountain.
- B. Verification of Dimensions: Before proceeding with any work, the contractor shall check and verify all dimensions, sizes, and the like, and shall assume full responsibility for the fitting-in of all materials and equipment to the conditions on site if the Fountain equipment manufacturer, Architect, and or Engineer is not notified in writing and a resolution is not agreed upon.
- C. All conflicts relating to any penetration size, dimension, elevation, equipment location, or equipment size or dimension, shall be addressed and resolved with the manufacturer, Architect, and or Engineer of record before the contractor can proceed with the construction of any part of the fountain that may be or become affected by the confliction.
- D. Verify Utilities: Contractor shall verify with local authorities where the proper tie into sanitary or storm sewer for overflow and drain.
- E. Contractor shall verify matching voltage and phase of main power feed provided to serve the fountain equipment control panel and report all discrepancies in writing to the Fountain Manufacturer, Architect, and Engineer.

3.2 INSTALLATION

- A. All equipment furnished under this Section shall be installed in full conformity with the Contract Documents, engineering data, instructions, and recommendations of the manufacturer.
- B. Contractor shall obtain all necessary installation permits and inspections.
- C. Installation of fountain equipment appurtenances shall confirm with provisions of Reference Standards and suit existing conditions on site as approved by Architect.
- D. Contractor shall insure that installation complies with all applicable national and local codes and project specifications.
- E. The incoming water supply line pressure must not exceed 50 PSI and is part of the building contract, not the fountain.
- F. Install horizontal piping 1' below freeze line.
- G. Excavation, Backfill, and Compaction:
 - 1. Excavating, trenching, and backfilling shall be as specified in the Contract Documents and as noted on the drawings and compaction done in a maximum of 6" lifts.
- H. All pools/splash pads shall be waterproofed by specified approved means.

- I. Prior to any finishing materials (I.E. lights, jets, coverplates) being installed, all pools shall be tested for leaks for a minimum of 72 hours and all waterproofing and tile work shall be completed.
- J. Refer to mechanical and electrical notes on drawing for further information.
- K. Contractor shall field verify all dimensions.
- L. Consult architectural, structural, mechanical, and electrical drawings for additional details not shown on these drawings.
- M. When applicable, all weirs shall be installed with an accuracy of “+” or “-“1/16” over the entire weir length. Unless otherwise noted, refer to the architectural drawings for weir details.
- N. Contractor shall provide all concrete work as required by all mechanical and electrical fountain equipment requirements including, but not limited to, housekeeping pads, lock-down slabs, and thrust blocks where indicated.
- O. Contractor shall provide all utilities such as power supplies, water supplies, and sewer connections under the building contract up to the fountain controls, equipment and/or pool fittings where indicated.
- P. Contractor shall provide and is responsible for all elevation and X-Y coordinates relating to all fountain equipment including vaults, pool floors, and pumps.

3.3 BASIC PIPING METHODS

- A. The Contractor shall verify and confirm all piping layouts, locations, and dimensions shown in these drawings, and insure that the specified locations do not interfere with other equipment, architecture, or construction before installation. All piping shall be installed as shown and as otherwise specified to make a complete, workable, and neat system. All piping shall be cut accurately from dimensions established at the Project site and allowances shall be made for clearance of other devices.
- B. All intra-connecting piping and associated fittings, supplied by system manufacturer, shall be a minimum of Schedule 80 PVC, NSF-PW rated. Interconnecting-intra-connecting interface points shall be slip fit, threaded or flanged
- C. All interconnecting piping and associated fittings, supports, and seals shall be per section 2.2 A.
- D. The Contractor shall not deviate from the pipe sizes shown herein unless prior written approval is obtained from the manufacturer and Architect. When a size is not indicated, the Contractor shall request the pipe size from the fountain manufacturer. In the event that interference with other equipment or architecture requires relocation of pipes or a layout different from that shown herein, the Contractor shall notify the fountain manufacturer immediately for reexamination of hydraulic parameters of the affected sections.

- E. Pipe and accessories shall be handled in such a manner to not cause damage. All cutting shall be done in a good workmanlike manner. Before installation, all piping and fittings shall be visually inspected for damage or defects. The interior of the pipe shall be clean during the laying operation. Pipe shall not be laid in water or in the trench when weather conditions are unsuitable for the work. Water shall be kept out of the trench until the pipe is installed. While work is in progress, open ends of the pipe and fittings shall be securely closed so that no trench water, earth, or other foreign matter will enter the piping system or fittings.
- F. Perform adequate trenching and backfill operations when installing PVC piping below grade. Trench width should be minimum of “pipe O.D. plus 12 inches” and deep enough to allow piping to be buried a minimum of 12” below the maximum expected frost penetration line to avoid freeze damage. Lay piping in horizontal, parallel, or perpendicular manner. Avoid vertical stacking of pipes. Space minimum of 3” apart on all parallel runs.
- G. Use only clean, free-flowing, non-expansive backfill material (naturally rounded ¼” pea gravel, 57 stone, or sand) and backfill in 6” lifts with adequate and complete compaction between lifts to 90% of maximum density per ASTM 1557-70. Compaction to excessive loads shall not be permitted. A second pressure test on the piping system must be made at this time to insure that piping has not been damaged during backfill operations.
- H. Concrete “thrust” blocking is recommended at all directional changes (tee’s, elbows, etc.), reducer fittings and line terminations (bushings, end caps, plugs, etc.) in fountain display discharge piping 6” and larger.
- I. The bearing surface for the concrete thrust blocks, where possible, should be placed against undisturbed soil. Where it is not possible, the fill between bearing surface and undisturbed soil must be compacted to at least 90% standard proctor density. Thrust block shall be a concrete mix not leaner than one part cement, two and one-half sand, and five parts stone. Contractor shall coordinate the location of the thrust block with other work and existing conditions. Work shall be performed in accordance with all applicable codes. For additional information, refer to NFPA 24.
- J. The sump pump in the equipment vault shall be connected as immediately as possible after secure placement and shall have a continuous power supply for the duration of the fountain system installation process.
- K. Pressure test all piping as specified in Part 3 Article “Field Quality Control” herein.
- L. Avoid laying suction piping in a manner that could result in a suction loop before, during, or after backfilling and compaction. Always pitch pipe in a downward direction to avoid a suction loop that will cause air to be permanently trapped, causing loss in performance of the piping system due to increased friction and work load demand.
- M. Piping in areas subject to freezing shall be installed at elevation of minimum 1 foot below frost line.
- N. Do not install any water lines above the control panel.
- O. Any and all costs associated with above are responsibility of installer.

3.4 BASIC ELECTRICAL METHODS

- A. The information supplied in the drawings specifies the general requirements of a complete functioning electrical power distribution and control system. The electrical subcontractor shall coordinate all electrical installation activities with the Construction Manager, Contractor, Architect, and (with respect to work Phase) other separate contractors performing work related to fountain installation.
- B. All electrical work shall comply with the latest edition of the National Electric Code (NEC), Section 680, published by the National Fire Protection Association; Quincy, Massachusetts. In the event of conflicting requirements between Contract Documents and any local electric code or other governing organizations for this location, the most stringent shall govern and take precedence. In this event, the Architect shall be notified immediately in writing of such conflict.
- C. The installation of electrical equipment and wiring in water can produce extreme hazards. It is the responsibility of the installing electrical contractor to consult and comply with all electrical codes and safety regulations prior to installation of electrical equipment. Local codes take precedence over the general notes where discrepancies of conflicts exist.
- D. All wiring and conduit shall be sized by the electrical sub-contractor in accordance with the latest edition of the NEC and all electrical codes and regulations. Where wiring and conduit sizes are specified herein, they shall be interpreted as minimum allowable sizes. All conductors shall be copper with insulation suitable for the particular wiring location. Minimum acceptable insulation is type THWN or better, suitable for both dry and wet locations. Conductor insulation shall be moisture resistant, flame-retardant thermoplastic as approved by the NEC. Conductor sizing shall be based on an ambient temperature of 30°C and a conductor temperature rating of 75°C maximum per Article 310 of NEC. All underwater electrical cable shall either be encased in waterproof, sealed PVC conduit or shall be rated for continuous operation in underwater, marine environments.
- E. Contractor shall obtain all necessary installation permits and inspections.
- F. It is the responsibility of the installing electrical contractor to insure that all electrical equipment is installed and wired, in accordance with Section 2.4 paragraph D above, whether it is called out or not within the contract documents. This is to be done by a qualified, licensed electrician, experienced in fountain system wiring. Delta Fountains assumes no responsibility for liability whatsoever for installations not carried out by a qualified, licensed, electrician in accordance with our shop drawings, and all provisions of the latest edition of NEC in general, Article 680 specifically, and local safety regulations. All Delta Fountains electrical control panels include GFCI's when and where required, when furnished.
- G. It is the responsibility of the installing electrical contractor to verify all field dimensions critical to fountain equipment installation and performance and report any discrepancies to Delta Fountains and the engineer upon immediate notice.

- H. All conductors shall be run in rigid conduit sized for the number of wires contained within per NEC requirements. Rigid conduit shall be corrosion resistant and either galvanized steel or rigid PVC. When conduit is submerged or in other wet locations, rigid PVC shall be required.

Conductor sizing shall be corrected for the number of wires to be run in a single conduit or raceway in accordance with NEC. All conduit locations and routing shall be approved by the Architect before installation.

- I. The work includes such necessary material and devices of a minor nature that may not be indicated on the drawings or mentioned in the specifications, but which are necessary for the compliance with codes and for the successful operation of the entire control system. The contractor shall be allowed no extra compensation because of this requirement.
- J. All GFCI protected circuits must have a separate neutral. All GFCI breakers have pigtails wired to a neutral bar. A Class 'A' ground fault circuit interrupter (GFCI) must be installed in each branch circuit supplying submersible or underwater fountain equipment. Equipment operating at 15 volts or less must be protected by suitable transformer U.L. Listed and marked for the application.
- K. Conduits are drawn for clarity and do not necessarily show exact routing. Contractor shall install conduits with as few changes in direction as jobsite conditions will allow.
- L. All electrical equipment must be properly bonded and grounded for safety, per the latest NEC and local code requirements. All bonding lugs shall be provided by installing electrical contractor. Installing contractor shall verify all necessary requirements of local inspector before installing, and notify Delta Fountains of any required deviations from specifications or plans or notes, and resolve all conflicts before installing equipment. Contractor to insure that all bonding codes are complied with for each metal pool equipment component.
- M. Submersible/underwater lighting fixtures must be installed for operation at 150 volts or less between conductors. Submersible pumps most operate at 300 volts or less between conductors.
- N. Submersible lighting fixtures must be installed with the top of the fixture lens a minimum of 2" below the normal operation water level and must have the lens adequately guarded to prevent contact by any person.
- O. All electrical equipment which depends on submersion for safe operation must be protected against overheating by an independent low water cutoff device if the water level drops below normal operating levels, or contain an internal Thermal Bimetallic Ambient compensating overload.
- P. Maximum length of exposed submersible cord in the fountain is limited to 9 feet. Cords extending beyond fountain perimeter must be enclosed in approved wiring enclosures.
- Q. All submersible lights and pumps must have sufficient cord length to allow removal from the water for re-lamping and normal maintenance. Fixtures can not be permanently embedded in the fountain structure so that the water level must be reduced or the fountain drained for re-lamping, maintenance, or inspection.

- R. Submersible equipment must be inherently stable or be securely fastened in place with non-corrosive fasteners suitable for the purpose.
- S. Underwater junction boxes must be filled with an approved re-enterable electrical potting compound (wax or paraffin is not acceptable) prior to filling pool and after all circuits have been checked to prevent the entry of moisture and must be firmly attached to supports or directly to the fountain surface and bonded as required. All conduit stubbed up through pool floor must be stainless steel. PVC, Red Brass, and Everdur are not acceptable as a conduit support stub for submersible junction boxes. All conduit entries must be completely sealed prior to potting to prevent compound from entering conduit system. After testing, junction boxes shall be sealed with scotch 3M re-enterable compound or other approved filling compound.
- T. All underwater junction boxes must be equipped with threaded conduit entries and compression type cord connectors for cord entry. Strain relief connectors serving niche-Mounted underwater lights shall be capable of sealing both the fixture cord and an AWG #8 insulated bonding wire which may be required by some local codes.
- U. Pull correct quantity and size conductors, wired with separate ground, through conduit into junction box. Make all splices and connections tight and well insulated. Connect ground wire to ground lug in junction box, or other suitable grounding location.
- V. Insert each submersible cord through the brass cord seals provided on the junction box and tighten completely.
- W. Do not operate submersible lights or pumps more than ten seconds unless completely submerged or damage will result and warranty will be voided.
- X. The installing electrical contractor will verify that all electrical equipment grounds will have the same reference potential and will give evidence of such to Delta Fountains before any equipment is initially energized.
- Y. The installing contractor shall size all feed-wires leading to fountain control panel for no more than 2% voltage drop, and shall notify Delta Fountains before fabricating electrical control panel if wire is upsized such that extra large wire lugs are required. It is the responsibility of electrical contractor to provide any disconnect required by local code requirements.
- Z. The fountain control panel shall be adequately protected from debris and stored properly during construction and prior to initial operation and shall be vacuumed clean and all screws for terminal connections tightened.
- AA. The electrical contractor shall ensure that supply voltage is within 5% of design voltage when all equipment is in operation and shall re-tap transformer, up size wire, or supply a buck and boost transformer to get supply voltage to necessary level, if necessary.
- BB. Wires for water level sensors must be run in a separate conduit to the fountain control panel.
- CC. All conduit penetrations through structure walls into trade areas below the pool structure must have the necessary allowances made for settlement.

- DD. Floor mounted motor control centers and transformers for fountain related equipment shall be installed on a 4” concrete housekeeping pad in equipment room.
- EE. Contractor installing fountain manufacturer supplied deck boxes in concrete for fountain lighting is to ensure that all open conduit ports are plugged watertight prior to slab pour around deck boxes.
- FF. All penetrations through outside walls to below grade shall be sealed per building specifications. Using “easy-link-seals” is recommended.
- GG. Any and all costs associated with the above are the responsibility of installing contractor.

3.5 FIELD QUALITY CONTROL

A. Inspection and Testing, General: Labor, materials, instruments, and power for testing shall be furnished by the Contractor. All tests shall be performed to the satisfaction of the Owner, Architect, and such other parties that may have legal jurisdiction. Item or system to be tested shall not be closed up, buried, or covered until testing is completed and owner confirms approval. Prepare reports of testing activities and submit as specified.

- 1. Reference Division 1 General Requirements for related and additional provisions.

B. Piping Test:

- 1. Conduct piping tests before joints are covered and after thrust blocks have been hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water. Flush out all pipes with clean water prior to performing leak tests.
- 2. Do not include equipment in tests which could be damaged by high pressure.
- 3. Automatic water make-up systems shall be thoroughly tested and operative at the time of final observation.
- 4. Pressure testing requires that a prescribed period of curing / drying time be allowed in order to allow the PVC cement to properly cure and take a permanent set. The following table sets forth the minimum drying period before the required pressure tests. Note that the table applies only to weather temperatures ranging from 50° F. to 90°F. For drying times during temperatures that differ from this, consult the fountain manufacturer.

Piping Size	Curing Time
1.5” – 2.5”	8 hours
3” – 4”	18 hours
6” – 8”	24 hours
10” & higher	36 hours

- 5. A 24-hour static pressure test of 10 ft. above highest vacuum, drainage, or gravity pipe invert elevation shall be performed on all vacuum and or gravity pipe lines using water as the medium. All vacuum and gravity drain piping shall be tested with no loss of water, pressure, or noticeable leaks. All pressure testing shall include a visual check of each joint by the Contractor in the presence of Construction Manager, owner, authorized representative, and/or Architect.

6. The Contractor shall provide all pumps, pressure plugs, gauges, and other instruments and devices necessary to perform the hydrostatic pressure tests specified herein. Each complete discharge piping system shall be hydrostatically tested to a pressure of 150% of the system working pressure. For purposes of this test, system-working pressure shall be defined at 50 PSIG and the hydrostatic test shall be performed at 75 PSIG. Pressure test for at least 8 hours, at which time pressure shall remain constant, without additional pumping, pressure loss, or noticeable leaks. PSI is required on all pressure piping to include return inlets piping using water as the medium.
7. Pressure test all water piping prior to commencing backfill operations. Hydrostatic (water) testing shall be the only approved method. **DO NOT PRESSURE TEST WITH COMPRESSED AIR** as severe pipe damage and bodily injury can occur. Do not exceed the rated operational pressure of the piping and/or fittings carrying the lowest pressure rating. Locate and repair any leaks and retest prior to completion of backfill operations
8. After the system has operated for one week, contractor and owner's representative shall inspect water make-up rates and agree that water usage is appropriate for a system of this type, are within local ordinances or codes, and that such rates are not indicative of excessive leakage from system. A water meter shall be placed on the fill line for this purpose, if necessary to document precise water usage.

C. Manufacturer's Field Services:

1. The fountain manufacturer shall be present for a minimum of 4 site coordination meetings, which includes the review of the plans and shop drawings with the mechanical, electrical, and structural disciplines. The fountain manufacturer must be available at the jobsite within a one week notice. The representative shall be a factory employee, not a local representative.

3.6 START UP AND ADJUSTMENTS

- A. Manufacturer shall be present for the initial start up of the fountain system.
- B. Contractor shall adjust fountain water system for volume and water flow characteristics to reflect design intent as approved by Architect.
- C. Contractor shall have the following conditions satisfied prior to departure of personnel from factory.
 1. All electrical connections shall be made and tested.
 2. All underwater lighting shall be lamped, installed and tested.
 3. Thoroughly test all fixtures, services, and all circuits for proper operating conditions and freedom from grounds and short circuits before acceptance is requested. All equipment, appliances, and devices shall be operated under load conditions
 4. All underwater junction boxes shall be wired and sealed with potting compound.
 5. Pump and filter motors shall be power tested to insure proper impeller rotation at specified voltage.
 6. Electronic water level control and/or low water cut-off control shall be installed and wired for operation.
 7. All hydraulic lines and fittings shall be pressure tested for leaks, repaired as necessary, and flushed clean. Basket strainers shall be checked and cleaned as required.

8. All nozzles, jets, manifolds, headers, and spray apparatus shall be installed properly and flushed of debris as required. Final nozzle adjustment for position and throttling to achieved specified performance for all display discharge points to be performed by installing contractor.
9. Pump vaults, when supplied by manufacturer shall be thoroughly cleaned of debris, tested for electrical integrity and pressure tested for leaks.
10. Chemical feed system, when supplied, shall be filled to proper level with required dosage of chemicals. (Manufacturer does not supply chemicals unless specifically listed in proposal).
11. The fountain basin shall be thoroughly cleaned and filled to proper water level with clean, fresh water.
12. Contractor shall make available to factory personnel a plumber and electrician who have first hand knowledge of the fountain installation, at contractors own expense.
13. Contractor will perform any manual labor or provide any tools for adjustment and start-up.

D. Contractor acknowledges the above requirements and understands that, should above requirements not be completed, factory personnel may immediately cancel visit and return to factory. In such case, Contractor shall be responsible for all costs and expenses incurred by manufacturer.

3.7 DEMONSTRATION

A. Furnish complete on-site instructions and demonstration to owner in the operation, adjustment and maintenance of fountain system.

END OF SECTION

SECTION 26 00 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General Electrical Requirements.
2. Work Included in Contract.
3. Definitions.
4. Dimensions and Equipment Location.
5. Owner Supplied Products.
6. Work by Owner.
7. Pre-Installation Meetings.
8. Demonstration and Training Meetings.
9. Product Data.
10. Shop Drawings.
11. Test Reports.
12. Manufacturer's Certificates.
13. Manufacturer's Instructions.
14. Manufacturer's Field Reports.
15. Quality Assurance and Control of Installation.
16. Temporary Facilities and Controls.
17. Delivery, Storage, and Handling Requirements.
18. Product Options.
19. Product Substitution Procedures.
20. Final Cleaning and Painting.
21. Starting of Systems.
22. Demonstration and Instructions.
23. Project Record Documents.
24. Extra Material and Spare Parts.
25. Operation and Maintenance Manuals.
26. Warranties.
27. Pre-bid Survey.

1.2 GENERAL ELECTRICAL REQUIREMENTS

- A. Mention of any article, operation or method requires that Contractor shall provide same and perform each operation in complete accordance with conditions stated.
- B. Contractor shall provide all material, labor, equipment and transportation as necessary to complete project in compliance with Contract Documents.
- C. In general, this work includes everything essential for a complete electrical system in operating order as shown on drawings and indicated in specifications.

- D. Work shall be installed in accordance with National, State, and Local codes, ordinances, laws, and regulations. Comply with all applicable OSHA regulations.
- E. Materials shall have a UL or ETL label where a UL or ETL standard or testing requirement exists.
- F. All work shall be installed in accordance with recommendations of manufacturer whose equipment is to be supplied and installed under this Contract.
- G. Before submitting a bid, each bidder shall examine all specifications and drawings relating to their work and shall become fully informed as to extent and character of work required and its relation to other work within project area.
- H. Contractor, in conjunction with Engineer's representative, shall establish exact locations of all materials and equipment to be installed. Consideration shall be given to construction features, equipment of other trades and requirements of equipment proper.
- I. All materials shall be suitably stored and protected prior to installation and all work shall be protected after installation, during construction and prior to acceptance.
- J. Contractor shall furnish all scaffolding, rigging, hoisting and services necessary for delivery, erection and installation of all equipment and apparatus required to be installed by Contractor. All such equipment shall be removed by Contractor upon completion of project.
- K. Refer to Division 01 – General Requirements for temporary electrical service.

1.3 WORK INCLUDED IN CONTRACT

- A. Contractor shall provide auxiliary contacts, buttons, and switches on starters as required.
- B. Contractor shall provide power wiring (120 V or greater) to control panels, motor starters, variable frequency drives, motors, electric actuators, electric devices and smoke detectors.

1.4 DEFINITIONS

- A. Exposed: Exposed to view in any room, corridor, stairway, or from the building's exterior.
- B. Code: National, State and Local Electrical codes including OSHA requirements.
- C. Provide, furnish, install, and wire ready for service.
- D. Signal Voltage: NEC class 1, 2, or 3 remote control, signaling, or power limited circuits.
- E. Low Voltage: 50 to 600 volts.
- F. Medium Voltage: 601 to 35,000 volts.
- G. High Voltage: 35,001 volts and greater.

- H. Electrical Ductbank: Assembly consisting of electrical conduits encased in concrete.
- I. Substitution: Manufacturer or method other than those listed by name in these specifications, on the Drawings, or in an Addendum.

1.5 DIMENSIONS AND EQUIPMENT LOCATION

- A. Drawings depicting electric work are diagrammatic and show, in their approximate location, symbols representing electrical equipment and devices.
- B. Exact locations of such equipment and devices shall be established in field in accordance with instructions from Engineer/Architect as established by manufacturer's installation drawings and details.
 - 1. Contractor shall refer to shop drawings and submittal drawings for all equipment requiring electrical connections to verify rough-in and connection locations.
 - 2. Unless specifically stated, no measurement of an electric drawing derived by scaling shall be used as a dimension to work by.
 - 3. Dimensions noted on electric drawings are subject to measurements of adjacent and previously completed work.
 - 4. All measurements shall be performed prior to actual installation of equipment.

1.6 OWNER SUPPLIED PRODUCTS

- A. Reference Division 01 – General Requirements for Owner supplied products.

1.7 WORK BY OWNER

- A. Reference Division 01 – General Requirements for work by Owner.

1.8 PRE-INSTALLATION MEETINGS

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

1.9 DEMONSTRATION AND TRAINING MEETING

- A. Contractor shall schedule and administer demonstration and training sessions for Owner for each portion of equipment and products that are required to have training in proper operation and maintenance.
- B. Contractor shall schedule representatives of the equipment manufacturer to attend demonstration and training sessions to provide additional information as necessary.

1.10 PRODUCT DATA

- A. Product Data: Submit to Engineer/Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Provide copies and distribute in accordance with Submittal Procedures article in Division 01 – General Requirements and for record documents purposes described in Division 01 – General Requirements.
- C. Submit number of copies Contractor requires, plus three copies Engineer/Architect will retain.
- D. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- E. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- F. After review distribute in accordance with Submittal Procedures article in Division 01 – General Requirements and provide copies for record documents described in Division 01 – General Requirements.

1.11 SHOP DRAWINGS

- A. Shop Drawings: Submit to Engineer/Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. The following shop drawing submittals are required:
 - 1. 26 09 43 Networked Lighting Controls
 - 2. 26 24 16 Panelboards
 - 3. 26 27 16 Cabinets and Enclosures
 - 4. 26 27 26 Wiring Devices
 - 5. 26 56 00 Exterior Lighting
- C. Produce copies and distribute in accordance with Submittal Procedures article in Division 01 – General Requirements and for record documents purposes described in Division 01 – General Requirements.
- D. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

- E. Shop drawings shall be submitted in advance of construction and installation so as to not cause delay in other Contractor's work.
- F. Data submitted for Engineer's review shall be numbered consecutively, shall be noted to correlate with electrical drawings and shall bear:
 - 1. Name and location of project.
 - 2. Name of Contractor.
 - 3. Date of submittal.
 - 4. Date of drawings and date of each correction and revision.
 - 5. If more than one type of lighting fixture (or other material) is on submitted sheet, proposed equipment shall be conspicuously checked with red pen by Electrical Contractor.
- G. Shop drawings for different systems and equipment shall, be bound separately by specification section and not bound by manufacturer. Each separate submittal shall be sent under a separate transmittal.
- H. Submittals which contain different specification section systems bound together shall be returned not reviewed and returned to Contractor for re-submittal.
- I. Lighting Fixture shop drawings shall consist of single submittal with all project light fixtures included. Submittals grouped by manufacturer shall not be accepted. Contractor shall be responsible for coordinating drawings from his various suppliers in order to comply with this requirement.
- J. Contractor shall examine shop drawings and equipment brochures prior to submission.
- K. Contractor shall verify that materials and equipment depicted will properly fit into construction.
- L. Contractor shall also review all previously completed work related to installation of equipment depicted to insure that it has been properly installed.
- M. No materials or equipment subject to prior review by Engineer shall be fabricated or installed by Contractor, without approval.
- N. Engineer's review of shop drawings shall not relieve Contractor of responsibility for deviations from requirements of drawings and specifications, unless prior approval for such deviations has been granted.
- O. Submit in electronic PDF format.
- P. After review, Contractor shall maintain copies required for Record Documents described in Division 01 – General Requirements.

1.12 TEST REPORTS

- A. Operation of equipment and electrical systems does not constitute an acceptance of work by Owner.

- B. Final acceptance is to be made after Contractor has adjusted their equipment and demonstrated that it meets or exceeds requirements of drawings and specifications.
- C. After work is completed and prior to acceptance, Contractor shall conduct following tests, tabulate data, date, sign and submit to Engineer:
 - 1. Standard megger insulation test on each feeder.
 - 2. Ground resistance test.
 - 3. Clamp ammeter test on each feeder conductor with all utilization equipment energized.
 - a. Load current in each phase conductor of feeder or portion thereof supplying panel shall not differ from average connected load currents in feeder conductors by more than 7-1/2 percent.
 - b. If load current does differ by more than 7-1/2 percent, Contractor shall change phase loading to same or receive written approval from Engineer that this is not required due to nature of load.
- D. Upon completion of installation, Contractor shall furnish certificates of approval from authorities having jurisdiction.
- E. Contractor shall demonstrate that all work is complete and is in specified operating condition, with raceway and conduit system properly grounded, wiring free from grounds, shorts, and entire installation is free from any physical defects.
- F. In presence of Engineer and Owner, Contractor shall demonstrate proper operation of all systems.
- G. Perform other testing as specifically directed in other sections of specifications for specific equipment.

1.13 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/ application subcontractor, or Contractor to Engineer/Architect, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer/Architect.

1.14 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.15 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Engineer's benefit as contract administrator or for Owner.
- B. Submit report within 30 days of observation to Engineer/Architect for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.16 QUALITY ASSURANCE/CONTROL OF INSTALLATION

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

1.17 TEMPORARY FACILITIES AND CONTROLS

- A. Reference Division 01 – General Requirements for temporary facilities and control requirements.

1.18 PRODUCT DELIVERY, STORAGE AND HANDLING REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- D. Store and protect products in accordance with manufacturer's instructions.
- E. Store with seals and labels intact and legible.

- F. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.19 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with following article.
- D. Materials and equipment required shall be of new manufacture.
- E. Items specified shall be of latest type or model produced by manufacturer specified. If model number is obsolete, substitute current manufacturer's product.

1.20 PRODUCT SUBSTITUTION PROCEDURES

- A. Substitutions will not be allowed. Where the Contractor wishes to use equipment or methods other than those listed by name, that equipment must be approved by the Engineer. To gain approval for equipment not listed, the Contractor shall follow the substitution request procedures outlined in the following paragraphs.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents, and specifically indicating where equipment differs from equipment specified.
- D. A request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.

2. Will provide same warranty for Substitution as for specified product.
 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 5. Will reimburse Owner and Engineer/Architect for review or redesign services associated with re-approval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on shop drawings or product data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 3. Lighting Fixtures: Request for substitutions shall include photometric test reports performed by an independent testing laboratory.
 4. Contractor shall provide samples of proposed equipment for Engineer's review, if requested by Engineer.
 5. Contractor shall furnish any other information or materials as requested by Engineer to establish equality.
 6. Engineer will notify Contractor in writing of decision to accept or reject request.
- G. Equipment and materials submitted without proper documentation shall be rejected without review.
- H. Contractor's submitting equipment for approval as an equal, shall include in their bid all incidental costs that may result from use of approved equipment.
- I. Such costs shall include, but not be limited to, additional costs that may be incurred by other contractors whose scope of work is affected by use of "equal" products.
- J. Electrical Contractor shall be responsible for those costs even if they do not become evident until after bidding.
- K. Only one request for substitution will be considered for each product.
- L. When substitution is not accepted, provide specified product.
- M. Submittals shall be received to allow for sufficient time to incorporate the acceptance into the bid documents through an addendum. Substitution submittals received after the issuance of the final addendum will not be considered.

1.21 FINAL CLEANING AND PAINTING

- A. Rubbish resulting from work shall be removed and disposed of on a daily basis in such manner as to be acceptable to Architect.

- B. Contractor shall clean all exposed iron work, interior and exterior of cabinets and pull boxes, etc., and remove rubbish and debris resulting from work.
- C. Where painted surfaces of equipment have been damaged or rusted during construction, Contractor shall paint same to match final.
- D. Clean other equipment as indicated in other sections of specification for specific equipment.

1.22 STARTING OF SYSTEMS

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

1.23 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instruct in classroom environment located at project site and instructed by manufacturer's representative who is knowledgeable about the Project.
 - 1. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
 - 2. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
 - 3. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at designated location.
 - 4. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
 - 5. Required instruction time for each item of equipment and system is specified in individual sections.

1.24 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of following electrical record documents; record actual revisions to the Work:
 - 1. Locations of all buried conduit or similar items. Include buried depth.
 - 2. Field changes of dimension or detail.
 - 3. Changes made by field order or change order.
 - 4. Details not on original contract drawings.
 - 5. Changes to circuit numbers.
 - 6. Junction box locations and conduit runs, with trade sizes indicated, for all lighting, power, and electrical systems installed.
 - 7. Master-share light fixture ballasting arrangements.
 - 8. Locations of all feeders and pullboxes.
 - 9. Record documents include:
 - a. Drawings.
 - b. Specifications.
 - c. Addenda.
 - d. Change Orders and other modifications to the Contract.
 - e. Reviewed Shop Drawings, Product Data, and Samples.
 - f. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including following:
 - 1. Manufacturer's name and product model and serial number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- G. Submit documents to Engineer/Architect for review. Documents shall be submitted in both electronic and hard copy formats.

1.25 EXTRA MATERIAL AND SPARE PARTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.26 OPERATION AND MAINTENANCE MANUALS

- A. Electrical Contractor shall assemble and submit to Architect for subsequent submission to Owner, three complete sets of a Manual of Operation and Maintenance for each of electrical and communications systems.
- B. Each manual shall consist of a 3-ring binder volume instructing Owner's personnel in operation and maintenance of system in question.
- C. All information shall be bound and secured in manual.
- D. Manual shall cover all phases of operation of equipment and shall be illustrated with photographs, drawings, and wiring diagrams.
- E. Manuals shall accurately describe operation, construction and adjustable features of complete system and its component parts.
- F. Manual shall be complete with an equipment parts listing to facilitate ordering of spare and replacement parts.
- G. Each manual shall contain two sets of final shop drawings depicting equipment as installed.

1.27 WARRANTIES

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring heavy duty binder with durable plastic cover.
- F. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.

2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.28 PREBID SURVEY

- A. Before submitting their bid, Contractor shall tour project site and review following items:
 1. Exact configuration of areas requiring demolition, temporary power, relocating, etc.
 2. Site conditions such as material storage, staging areas, parking, etc.
 3. Problems with work sequence.
- B. Any conditions found that are not shown on drawings or stated within project manual that may affect scope of work shall be reported to Engineer.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Sleeves: ASTM A53, Schedule 40 galvanized steel pipe.

2.2 ACCESS PANELS

- A. Access panels required by code or otherwise to electrical service equipment shall be supplied and installed by Electrical Contractor.

PART 3 - EXECUTION

3.1 FIRESTOPPING

- A. Openings in fire rated construction and annular spaces around conduits, cable trays, and other penetrating items shall be protected in accordance with NEC Article 300.21 and in accordance with Wisconsin Administrative Code, Department of Commerce Chapter 51.049. Fire rating of protective seal shall be at least that of floor or wall into which it is installed, so that original fire rating of construction is maintained.
- B. Wall or floor penetration openings shall be as small as possible.
- C. Openings and annular spaces required by code to be protected, shall be protected.
- D. Installation of materials and assemblies shall be in strict accordance with manufacturer's instructions.

3.2 SLEEVES

- A. Where conduits, cables trays, or other electrical raceways must pass through floors or walls that are to be constructed of poured in place concrete, contractor shall provide sleeves in formwork prior to concrete pour. It shall be Electrical Contractor's responsibility to provide all sleeves for his work unless specifically indicated otherwise on drawings. Prior to installing sleeves, contractor shall prepare drawings indicating locations, quantities, sizes, and spacings of all sleeves anticipated. Drawings shall be forwarded to structural engineer for approval.
- B. Floor sleeves shall extend minimum of 2 inches above finished floor.

END OF SECTION

SECTION 26 05 01

ELECTRICAL DEMOLITION AND ALTERATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removal of existing electrical equipment, wiring, and conduit in areas to be remodeled.
2. Removal of designated construction; dismantling, cutting and alterations for completion of Work.
3. Disposal of materials.
4. Storage of removed materials.
5. Identification of utilities.
6. Salvaged items.
7. Protection of items to remain as scheduled at end of section and as indicated on Drawings.
8. Relocate existing equipment to accommodate construction.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.
3. Section 02 41 13 – Selective Site Demolition and Abandonment.

1.2 CLOSEOUT SUBMITTALS

A. Division 01 – General Requirements: Procedures for closeout submittals.

B. Section 26 00 00 – Basic Electrical Requirements: Record actual locations of capped utilities and conduits and equipment abandoned in place.

1.3 QUALITY ASSURANCE

A. Contractor shall notify the Engineer of any existing code violations observed during the course of performing his work. The Engineer will decide if corrective action needs to be taken. Corrective actions that change the scope of the work will be considered a change order and will be processed accordingly.

1.4 SEQUENCING

A. Division 01 – General Requirements: Requirements for sequencing.

1.5 SCHEDULING

A. Division 01 – General Requirements: Requirements for scheduling.

B. Existing buildings shall remain in service during construction.

- C. Prior to demolition or alteration of structures, the following shall be accomplished:
 - 1. Owner release of such structure.
 - 2. Disconnection of electrical power to equipment and circuits removed or affected by demolition work.
 - 3. Electrical services rerouted or shut off outside area of demolition.
 - 4. Coordinate sequencing with Owner and other Contractors.
 - 5. Survey and record condition of existing facilities to remain in place that may be affected by demolition operations.

- D. Power outages and interruptions in building systems shall be held to a minimum and shall be done at a time convenient to Owner. Time of all outages shall be scheduled with Owner and all other trades affected by outage at least ten working days in advance.

- E. Perform noisy, malodorous, or dusty work:
 - 1. Between hours of 5:00 p.m. and 10:00 p.m.

- F. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

1.6 COORDINATION

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.

- B. Coordinate demolition work with the general contractor and other trades.

- C. Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.

- D. Shut-down Periods:
 - 1. Arrange timing of shut-down periods of in service panels with Owner. Do not shut down any utility without prior written approval.
 - 2. Keep shut-down period to minimum or use intermittent period as directed by the Owner.
 - 3. Maintain life-safety systems in full operation in occupied facilities.

- E. Identify salvage items in cooperation with Owner. Owner may keep any equipment in demolition areas. Contractor shall deliver equipment owner wants salvaged to area in building designated by owner. Contractor shall remove all materials in demolished area not salvaged from site. Contractor shall obtain release of all materials before disposition.

- F. After demolition operations are completed, survey conditions and restore existing facilities to their pre-demolition condition.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify of existing conditions before starting work.
- B. Verify wiring and equipment indicated to be demolished serve only abandoned facilities.
- C. Verify termination points for demolished services.

3.2 PREPARATION

- A. Erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of public, Owner, Contractor's employees, and existing improvements to remain.
- B. Temporary egress signage and emergency lighting.

3.3 DEMOLITION

- A. Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- B. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- C. Remove conduit, wire, boxes, and fastening devices to avoid any interference with new installation.
- D. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- E. Reconnect equipment being disturbed by renovation work and required for continued service to nearest available panel.
- F. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit and wiring which are not part of final project.
- G. Install temporary wiring and connections to maintain existing systems in service during construction.
- H. Perform work on energized equipment or circuits with experienced and trained personnel.
- I. Remove, relocate, and extend existing installations to accommodate new construction.
- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finishes. Cut embedded support elements flush with walls and floors.

- L. Clean and repair existing equipment to remain or to be reinstalled.
- M. Protect and retain power to existing active equipment remaining.
- N. Electrical equipment in conflict with construction shall be removed or relocated as indicated on drawings, as directed, or required.

3.4 MODIFICATIONS

- A. Feeders, branch circuits, and other system wiring which are to remain in service but which are presently routed through areas being demolished shall be rerouted around demolition area.
- B. Where existing branch circuits are to be extended or modified, existing conduit may be reused at Contractor's discretion. Existing conduits that are removed from their existing location shall be reused.
- C. Existing wiring may be spliced and used to extent that it was not removed. Any existing conductors removed shall not be re-pulled and then reused.

3.5 EXISTING PANELBOARDS

- A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.
- B. Tag unused circuits as spare.
- C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.
- D. Remove existing wire no longer in use from panel to equipment.
- E. Provide new updated directories where more than three circuits have been modified or rewired.

3.6 SALVAGE ITEMS

- A. Remove and protect items requested by Owner to be salvaged and transport to location on site designated by Owner.

3.7 REUSABLE ELECTRICAL EQUIPMENT

- A. Carefully remove equipment, materials, or fixtures which are to be reused. Only items specifically identified as be reused shall be reused.
- B. Disconnect, remove, or relocate existing electrical material and equipment interfering with new installation.
- C. Relocate existing lighting fixtures as indicated on Drawings. Clean fixtures and re-lamp. Test fixture to see if it is in good working condition before installation at new location.

3.8 CLEANING

- A. Provide under provisions of Division 01 - General Requirements.
- B. Remove demolished materials as work progresses. Legally dispose materials.
- C. Keep workplace neat.

3.9 DISPOSAL

- A. Contractor shall tour demolition areas with Owner to determine status of all equipment to be removed during demolition.
- B. All equipment that is to be salvaged for reuse by the Owner shall be removed by Contractor and transported to an Owner designated storage area on site.
- C. Raceway, boxes and supporting devices shall become property of Contractor and shall be removed from site and disposed of by the Contractor.
- D. Removed equipment shall be disposed of by Contractor unless specifically otherwise indicated on drawings or requested by Owner. Contractor shall provide transport for disposal.

3.10 LIGHTING FIXTURE BALLAST DISPOSAL

- A. Contractor shall inspect all ballasts in all light fixtures removed as part of this project and take actions described below.
- B. All ballasts labeled as "NON PCB'S" or "NO PCB'S" shall be handled as described in other sections of these specifications which describe demolition or salvage materials handling. If PCB content is not stated on ballast label, ballast shall be handled as a PCB ballast.
- C. All PCB ballasts shall have wires clipped off and ballasts placed in US DOT approved type 17C or type 17H barrels and placed in storage in a location within building as designated by Owner. Contractor shall provide to Owner, in typewritten form, a total count of these ballasts and where they are stored.
- D. These ballasts are not to be removed from work site by Contractor.
- E. Contractor shall label and mark PCB storage barrels with EPA approved PCB labels and shall mark storage area with signs, marks, and lines to meet regulations of Wisconsin Code NR 157.
- F. Contractor shall provide approved PCB absorbent materials to be stored immediately adjacent to barrel storage area. Do not place loose absorbent material in barrels.
- G. When ballast demolition is completed and all PCB ballasts are placed in barrels ready to be picked up for disposal, Contractor shall notify Owner in writing so Owner can make arrangements for pick up and disposal of PCB ballasts.

3.11 LIGHTING FIXTURE LAMP DISPOSAL

- A. Contractor shall be responsible for proper removal and recycling of all existing fixture lamps being removed from service in accordance with EPA and State of Wisconsin DNR requirements. Lamps shall not be disposed of in any way except as described herein.
- B. Contractor shall be responsible for arranging for recycling of lamps by a licensed waste lamp and bulb recycler. Cost for recycling of removed lamps shall be included in Contractor's bid.
- C. Contractor shall carefully package removed lamps to prevent breakage. Contractor shall store waste lamps in a secure area, either in container that lamps are shipped in or in other ways so as to eliminate breakage. Both lamp storage area and individual containers should be labeled as hazardous waste. Store lamps in covered containers to prevent lamps from being broken as a result of other debris being placed on top of them.

3.12 ALTERATIONS

- A. Contractor shall be responsible for coordination of other trades to facilitate installation in existing building.
- B. Work shall include, but is not limited to, cutting, patching, refinishing and all work necessary and required to leave existing building in a condition acceptable to engineer.

3.13 PROTECTION OF FINISHED WORK

- A. Furnish under provisions of Division 01 - General Requirements.
- B. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 26 05 02

ELECTRICAL WIRING METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this section.
2. Section 26 00 00 – Basic Electrical Requirements.
3. Section 26 05 19 – Wire and Cable.
4. Section 26 05 33 – Raceways and Boxes.

1.2 REFERENCES

A. International electrical Testing Association (NETA): NETA-ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association (NFPA):

1. NFPA70 – National Electrical Code (NEC).
2. NFPA 72 – National Fire Alarm Code.

1.3 COORDINATION

A. Division 01 – General Requirements: Requirements for Coordination

B. When wire and cable destination is indicated but routing is not shown, contractor shall determine routing and lengths required in the field. Circuits shall be routed in compliance with parameters listed herein and elsewhere in these project specifications.

C. Wire and cable routing indicated is approximate unless dimensioned on the plans.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ELECTRICAL SYSTEMS OPERATING AT 120 VOLTS TO GROUND AND GREATER

A. In general, the wiring method used for electrical systems covered by this section shall be individual conductors installed in metallic or non-metallic circular raceways of the types specified in Section 26 05 33 – Raceways and Boxes. This wiring method shall encompass associated raceway system outlet boxes, junction boxes, pull boxes, wireways, handholes, and manholes.

B. Unless otherwise prohibited by applicable codes, exceptions to the use of individual conductors in raceways shall include the following:

1. Individual conductors installed in surface metallic or non-metallic multi-outlet raceways as specified in Section 26 05 33 and as indicated on the drawings.

2. Individual conductors in listed outdoor lighting poles and bollards.

3.2 ELECTRICAL SYSTEMS OPERATING AT LESS THAN 120 VOLTS TO GROUND – EXCLUDING FIRE ALARM SYSTEM CABLING

- A. In general, the wiring method used for electrical systems covered by this section shall be individual conductors or cables installed in metallic or non-metallic circular raceways of the types specified in Section 26 05 33 – Raceways and Boxes. This wiring method shall encompass associated raceway system outlet boxes, junction boxes, pull boxes, wireways, handholes, and manholes.
- B. Exceptions to the general wiring method are listed in the following paragraphs. These exceptions do not apply to wiring and cabling associated with essential electrical systems. Examples of essential electrical systems include, but are not limited to:
 1. Standby power system control wiring.
 2. Areas of Refuge Call System Wiring.
 3. Code required alarm and notification systems.
 4. Conductors routed in air-handling ceiling plenums, floor plenums, or vertical risers.
 5. Where exceptions conflict with code requirements, Code requirements shall be followed.
- C. Unless otherwise prohibited by applicable codes, in dry, interior, heated spaces, exceptions to the use of individual conductors and cables in raceways shall include the following:
 1. Conductors and cables routed in static (non-air handling) accessible ceiling plenums may be routed in free air, supported by bridal rings, J hooks, cable trays, or other acceptable methods as specified and as indicated on the plans.
 2. Conductors and cables routed at the ceilings of unfinished electrical and mechanical rooms may be routed in free air, supported by bridal rings, J hooks, cable trays, or other acceptable methods as specified and as indicated on the plans.
 3. Conductors and cables routed at the ceilings of IT rooms and cables routed vertically between IT room ceiling raceways and IT racks may be routed in free air, supported by bridal rings, J hooks, cable trays, or other acceptable methods as specified and as indicated on the plans.
- D. Refer to specification sections of individual systems for additional information and requirements.

3.3 CIRCUIT CONCEALMENT AND ROUTING

- A. Section 26 05 33 – Raceway and Boxes, contains requirements and restrictions for concealing circuits from view, regarding the installation of circuits near high temperature equipment, where penetrating fire rated assemblies, for circuits crossing expansion joints, for circuits that penetrate freezers and coolers, etc. The applicable requirements of Section 26 05 33 shall apply to all project wiring methods for all types of electrical circuits, regardless of whether those circuits are installed in raceways, routed in free air, or another wiring method allowed by these specifications.

END OF SECTION

SECTION 26 05 03

WIRING CONNECTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electrical Connections to Equipment.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 05 19 - Building Wire and Cable.
3. Section 26 05 33 - Raceway and Boxes.

1.2 REFERENCES

A. National Electrical Manufacturers Association (NEMA):

1. NEMA WD 1 - General Requirements for Wiring Devices.
2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

A. Division 01 – General Requirements: Procedures for submittals.

B. Product Data: Submit wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

A. Section 26 00 00 – Basic Electrical Requirements: Procedures for closeout submittals.

B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.5 COORDINATION

A. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation of equipment.

- D. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.1 CORD AND PLUGS

- A. Attachment Plug Construction: Conform to NEMA WD 1.
- B. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.
- C. Cord Construction: Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit over-current protection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 INSTALLATION

- A. Make electrical connections.
- B. Make conduit connections to equipment that is subject to vibration using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations. Equipment subject to vibration shall include:
 - 1. Transformers.
 - 2. Motors.
 - 3. Packaged HVAC equipment.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- F. Provide disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- G. Provide terminal block jumpers to complete equipment wiring requirements.
- H. Provide interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

- I. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

3.3 ADJUSTING

- A. Division 01 - General Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

3.4 SPECIAL OUTLET AND MOTOR WIRING SCHEDULES

- A. See Drawings.

END OF SECTION

SECTION 26 05 19

WIRE AND CABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wire.
2. Cable.
3. Wiring Connectors.
4. Connections.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.
3. Section 26 05 53 – Electrical Identification.

1.2 REFERENCES

A. International Electrical Testing Association (NETA):

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code (NEC).

1.3 CLOSEOUT SUBMITTALS

A. Division 01 – General Requirements: Procedures for closeout submittals.

B. Project Record Documents: Record actual locations of components and circuits.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years.

1.5 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.6 COORDINATION

A. Division 01 – General Requirements: Requirements for coordination.

- B. When wire and cable destination is indicated and routing is not shown, determine routing and lengths required.
- C. Wire and cable routing indicated is approximate unless dimensioned.

PART 2 - PRODUCTS

2.1 WIRE

- A. Product Description: Single conductor insulated wire.
- B. Conductor: Copper only. At the Contractor's option, aluminum conductors size #1/0 and larger may be substituted for copper and used for phase and neutral conductors for transformer feeders, switchboard feeders, and panelboard feeders. All ground conductors shall be copper.
 - 1. Aluminum conductors shall not be used for serving individual motors, chillers, VFD's and motor controllers.
 - 2. The following requirements shall be met when aluminum conductors are used:
 - a. Aluminum alloy conductors shall be compact stranded conductors of a recognized Aluminum Association 8000 Series aluminum alloy conductor material (AA-8000 series alloy).
 - b. It is the responsibility of the contractor to increase the size of the conduit, wire gutter, or enclosure, if necessary, to accommodate the aluminum conductors and meet allowable code requirements.
 - c. It is the responsibility of the contractor to increase the size of the aluminum conductor and associated termination lugs to match the ampacity of the copper conductor circuit shown on the Drawings.
 - d. Contractor shall submit a feeder schedule to the Engineer for all conductor substitutions indicating the aluminum conductor wire size and the conduit size. The contractor shall not begin the installation until written approval is granted by the Engineer.
 - e. All aluminum conductors shall terminate on a mechanical screw-type connector or mechanical compression-type connector. Connector shall be dual rated (AL7CU or AL9CU) and Listed by UL for use with aluminum and copper conductors, and sized to accept aluminum conductors of the required ampacity. When using compression-type connectors, the lugs shall be marked with wire size, die index, number and location of crimps and shall be suitably color-coded. Using a suitable stripping tool, remove insulation from the required length of the conductor. Wire brush the conductor and apply a Listed joint compound. Tighten or crimp the connection per the connector manufacturer's recommendation. Wipe off any excess joint compound.
 - f. When terminating aluminum conductors to aluminum bus, prepare a mechanical screw-type or compression-type connection. Bolts shall be anodized alloy and conform to current ANSI and ASTM chemical and mechanical property limits. Nuts shall be aluminum alloy and conform to current ANSI standards. Washers shall be flat aluminum alloy, Type A plain, standard wide series conforming to current ANSI standards. Lubricate and tighten the hardware per manufacturer's recommendations
 - g. When terminating aluminum conductors to copper bus, prepare a mechanical screw-type or compression-type connection. Bolts shall be plated or galvanized medium carbon steel; heat treated, quenched and tempered equal to current ASTM standard or SAE grade 5. Nuts shall conform to current ANSI standards. Washers shall be steel, Type A plain,

standard wide series conforming to current ANSI standards. Belleville conical spring washers shall be of hardened steel, cadmium plated or silicone bronze. Lubricate and tighten the hardware per manufacturer's recommendations.

- h. The final tightening torque shall be recorded for all aluminum conductor mechanical screw-type connections and provided in report form, in the completed O&M manuals.
- i. Contractor shall perform an infrared survey of all aluminum conductor connections after the installation is complete and in normal service. Infrared surveys shall be performed during periods of maximum possible loading with at least 30% of rated load of the equipment being inspected. All connections with elevated temperatures shall be corrected by the contractor. The infrared survey results shall be provided in report form, in the completed O&M manuals.

C. Insulation Voltage Rating: 600 volts, rated 75 degrees C unless otherwise noted.

D. In mechanical rooms, light fixtures, and others high temperature applications, insulation shall be rated 90 degrees C. or greater.

E. Provide following wiring types:

- 1. Concealed or exposed dry interior locations: Use only building wire Type THHN/THWN or XHHW insulation in raceway.
- 2. Above Accessible Ceilings: Use only building wire Type THHN/THWN or XHHW insulation in raceway.
- 3. Wet or Damp Interior Locations: Use only building wire Type XHHW-2 insulation in raceway.
- 4. Exterior Locations: Use only building wire Type XHHW-2 insulation in raceway.
- 5. Underground Locations: Use only building wire Type XHHW-2 or USE insulation, in raceway.

F. Solid or Stranded conductor for 10 AWG and smaller. Conductor 8 AWG and larger shall be stranded.

G. Conductor not smaller than 12 AWG for power and lighting circuits.

H. Conductor not smaller than 14 AWG for control circuits.

I. All wires shall be new, delivered to the site in unbroken cartons and shall be less than one year old out of manufacturer's stock.

2.2 WIRING CONNECTORS

A. Conductors No. 10 AWG and Smaller: Scotch 3M - Scotch-lok compression type solderless connectors with plastic cover.

B. Joints, Taps, and Splices in Conductors No. 8 AWG and Larger: Solderless compression type connectors, tool and die applied, of a type that will not loosen under vibration or normal strains. Burndy "Hy-Dent" type or equivalent as acceptable to Engineer.

C. Rubber insulating electrical tape: Scotch 3M model 23, 30-mil tape.

- D. Split bolt connectors are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Install in accordance with manufacturer's written instructions and in accordance with recognized industry practices.
- B. Run wire and cable in conduit, unless otherwise indicated on drawings.
- C. Do not draw conductors into conduits until building is enclosed and watertight and until work that may cause conductor damage has been completed.
- D. Voltage drop for branch circuits and feeder circuit combined shall not exceed requirements of NEC Article 215.
- E. Examine areas and conditions under which conductors are to be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of work.
- F. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 JOINTS, TAPS AND SPLICES

- A. Each tap, joint, or splice in conductors No. 8 AWG and larger shall be taped with two half-lap layers of vinyl plastic electrical tape and a finish wrap of color coding tape, where required by code.
- B. Cable splices shall be made only in distribution and junction boxes.

3.3 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.4 EXISTING WORK

- A. Remove exposed abandoned wire and cable including abandoned wire and cable above accessible ceiling finishes.
- B. Patch surfaces where removed cables pass through building finishes.
- C. Disconnect abandoned circuits and remove circuit wire and cable.
- D. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed.
- E. Install blank cover for abandoned boxes not removed.

- F. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.
- G. Extend existing circuits using materials and methods as specified.
- H. For additions to existing buildings, existing conductor color coding schemes shall be followed unless in conflict with codes. If no logical color coding scheme exists, color coding indicated above shall be followed.

3.5 INSTALLATION

- A. Route wire and cable to meet project conditions.
- B. Conductors shall not be installed at temperatures below manufacturer's minimum installation temperature.
- C. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- D. Identify and color code wire and cable under provisions of Section 26 05 53 – Electrical Identification.
- E. Identify each conductor with its panel and circuit number or other designation indicated.
- F. Special Techniques - Building Wire in Raceway:
 - 1. Pull conductors into raceway at same time.
 - 2. Install building wire 4 AWG and larger with pulling equipment.
- G. Special Techniques - Wiring Connections:
 - 1. Clean conductor surfaces before installing lugs and connectors.
 - 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
 - 4. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - 5. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
 - 6. When 10 AWG and smaller stranded conductors are used install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

3.6 BRANCH CIRCUIT CONDUCTORS

- A. Install branch circuits and switched circuits as required to comply with circuiting, switching, and control functions shown on drawings.
- B. Conductors shall be size 12 AWG minimum, unless otherwise noted, for branch circuit wiring, including motor circuits.

- C. Size 120V branch circuits for length of run on following basis:
 - 1. 0 to 75 ft. run from panelboard to first outlet: No. 12 AWG minimum.
 - 2. 76 to 125 ft. run: increase one wire size, No. 12 AWG becomes No. 10 AWG.
 - 3. 126 to 200 ft run: increase two wire sizes, No. 12 AWG becomes No. 8 AWG.
 - 4. 201 and above: wiring to be sized for 3 percent maximum voltage drop.
- D. Provide individual neutral conductors for all branch circuit phase conductors. Multi-wire branch circuits sharing a common neutral will not be allowed.
- E. Route branch circuits and switch legs as dictated by construction, these specifications, or instruction from Engineer.
- F. Size conduit, outlet boxes, and other raceway system components in accordance with NEC requirements as minimum.
- G. Circuit numbers as shown on drawings are for Contractor to plan their wiring and for estimating purposes and are not necessarily exact circuit numbers to be used in specific panel for particular load.
- H. Exact circuit numbers for each load are to be selected by Contractor at their option.
- I. Balanced load on panelboard bus will be determining factor in arrangement of circuits. Panelboards average load shall not differ from phase to phase by plus or minus 7.5 percent.
- J. Motor and equipment branch wiring.
 - 1. Furnish and install motor circuits in accordance with schedules on drawings and code requirements, from source of supply to associated motor starter, and from starter to motor terminal box, including necessary and required intermediate connections.
 - 2. Conductor and conduit size for motor branch circuits, if shown on drawings, are sized for motor requirement only.
 - 3. Control wiring is not included in conduit sizes shown on drawings.
 - 4. Motors shall have proper conductor sizes as per NEC requirements and nameplate ratings.
 - 5. Contractor shall be responsible for verification of ratings of motors and installing proper branch circuits.
 - 6. Obtain manufacturer's wiring diagrams and shop drawings for equipment requiring electrical connections.
 - 7. Check drawings and specifications of other divisions of work for equipment and work, which shall be included in order to provide a complete electrical installation.
 - 8. Motor connections shall be made by compression type connectors using proper tools and fittings to assure good electrical continuity and low resistance joint.

3.7 FEEDER INSTALLATION

- A. Install in accordance with manufacturer's written instructions, and in accordance with recognized industry practices.
- B. Extend feeders at full capacity from origin to termination.

- C. Feeder conduits shall contain only those conductors constituting a single feeder circuit.
- D. Where feeder conductors are run in parallel, conductors shall be of same length, same material, circular-mil area, insulation type, and terminated in same manner.
- E. Where parallel feeder conductors run in separate raceways, each raceway shall have same physical characteristics.
- F. Feeders shall follow most accessible routes, concealed in construction in finished areas, exposed to minimum temperature gradient and to minimum temperature fluctuation.
- G. Confine feeders to insulated portions of building, unless otherwise specified.
- H. Trapped feeder runs without facilities for continuous drainage are not acceptable.
- I. Feeder conduits shall not be routed in conduit floor slabs or below basement or grade level floor slabs.
- J. Feeder conductors in switchboards, panelboards, pullboxes, gutters, and other open wiring spaces shall be bundled by feeder using plastic tie wraps at intervals not greater than 3 feet on center.

3.8 FIXTURE WIRES

- A. Use conductor with insulation suitable for current, voltage, and temperature to which conductor will be subjected.
- B. Provide minimum No. 12 wire size for conductors supplying power to a single fixture. 600V insulation minimum.
- C. Insulation suitable for operation at 90 degrees C. minimum for lighting fixtures with integral ballast, mogul base sockets, quartz lamps, or otherwise where subject to excessive temperatures.
- D. Fixture wiring shall be continuous wiring system to lampholder or to ballast and from ballast to lampholder.

3.9 IDENTIFICATION AND LABELLING

- A. For materials specified in this section, see specification Section 26 05 53 for identification and labeling requirements.

3.10 FIELD QUALITY CONTROL

- A. Division 01 – General Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rod electrodes.
2. Wire.
3. Grounding well components.
4. Mechanical connectors.
5. Exothermic connections.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.
3. Section 26 05 19 - Wire and Cable.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers (IEEE):

1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

B. International Electrical Testing Association (NETA): NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes:

1. Metal underground water pipe.
2. Metal building frame.
3. Concrete-encased electrode.
4. Ground ring.
5. Rod electrode.

1.4 DESIGN REQUIREMENTS

- A. Provide all material, labor and incidentals necessary for the completion of this section of the work.**

1.5 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms maximum.

1.6 SUBMITTALS

A. Section 26 00 00 – Basic Electrical Requirements: Procedures for submittals.

B. Product Data: Submit data on grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground. Indicate soil conditions when tests were done including when last rain occurred.

1.7 CLOSEOUT SUBMITTALS

A. Division 01 – General Requirements: Procedures for closeout submittals.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.8 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

B. Perform Work in accordance with National Electric Code and state and local code requirements.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years' experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and protect products under provisions of Division 01 – General Requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

D. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.11 COORDINATION

A. Coordinate complete grounding and bonding of building reinforcing steel prior to concrete placement.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

A. Manufacturers:

1. Galvan Industries/Erico Inc.
2. LTV/Copperweld, Inc.
3. Eritech/Erico, Inc.
4. Lyncole XIT Grounding.
5. Harger Lightning and Grounding.

B. Product Description:

1. Material: Copper-clad steel.
2. Diameter: **3/4 inch**.
3. Length: **10 feet**.

C. Connector: Connector shall be exothermic welded connection unless otherwise noted. Provide U-bolt clamp in ground test wells and where indicated on drawings.

2.2 WIRE

A. Material: Stranded copper. Provide tin plated copper where exposed to corrosive environment.

B. Connection to Electrodes: 2/0 AWG, minimum size.

C. Grounding Electrode Conductor: Copper conductor, bare.

D. Bonding Conductor: Copper conductor, bare.

2.3 GROUNDING WELL COMPONENTS

A. Well Pipe: **8 inches NPS (DN200)** by **24 inches** long fiberglass pipe with belled end.

B. Well Cover: Fiberglass with legend "GROUND" embossed on cover.

2.4 MECHANICAL CONNECTORS

A. Manufacturers:

1. Erico, Inc.
2. ILSCO Corporation.
3. O-Z Gedney Co.
4. Thomas & Betts, Electrical.
5. Burndy Electric.

B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

- C. Ground clamp fittings shall be interlocking clamp type, fabricated from high strength corrosion resistant metal with high strength silicon bronze u-bolts, nuts, locks, and lock washers.

2.5 EXOTHERMIC CONNECTIONS

A. Manufacturers:

1. Thermoweld.
2. Cadweld, Erico, Inc.
3. Harger Lightning Protection.
4. Exothermic Welding Co.
5. Thomas & Betts, Electrical.

- B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

2.6 GROUND BUSSES

- A. Copper only.

- B. Cross section shall be 1/4 inch x 2 inches, lengths as shown on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify of existing conditions before starting work.
- B. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

- A. Remove paint, rust, mill oils, and other surface contaminants at connection points.

3.3 EXISTING WORK

- A. Modify existing grounding system to maintain continuity to accommodate renovations.
- B. Extend existing grounding system using materials and methods as specified.

3.4 INSTALLATION

- A. Install in accordance with IEEE 142.
- B. Install rod electrodes near location of electric service entrance unless otherwise shown on drawings. Install additional rod electrodes, if required, to achieve specified resistance to ground.
- C. Install interconnecting wire 2 feet below finish grade.

- D. Install grounding and bonding conductors concealed from view.
- E. Install grounding well pipe with cover at rod locations as indicated on Drawings. Install well pipe top flush with finished grade.
- F. Bond together metal siding not attached to grounded structure; bond to ground.
- G. Bond together reinforcing steel and metal accessories in pool and fountain structures.
- H. Install ground grid under access floors as indicated on Drawings. Construct grid of 4 AWG bare copper wire installed on 24 inch centers both ways. Bond each access floor pedestal to grid.
- I. Bond together each metallic raceway, pipe, duct and other metal object entering space under access floors. Bond to underfloor ground grid. Install 2 AWG bare copper bonding conductor.
- J. Bond to lightning protection system. Refer to Division 26.
- K. Install continuous grounding using underground cold water system, driven ground rods, and building steel as grounding electrode.
- L. Ground electrical systems and equipment as required by code, utility, local ordinances, and to requirements herein.
- M. Install separate code rated grounding conductors to special equipment and activity areas as required by code.
- N. Bond all metallic piping systems and service equipment as required by NEC.
- O. Permanently attach grounding conductors prior to energizing equipment.
- P. Drive ground rods to a depth 4-inches below finished grade.
- Q. Grounding electrode conductor shall be continuous without splice from nearest building grounding electrode. Ground to service equipment. Install bonding jumper around water meter. Attach non-ferrous metal tag to warn against removal. Make connections to ground electrodes with approved molded exothermic weld process.

3.5 EQUIPMENT GROUND

- A. Bond metallic conduits, supports, cabinets, and other equipment so ground will be electrically continuous from service to outlet boxes.
- B. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

- C. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits.
- D. Size grounding conductors in accordance with NEC.
- E. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment.
- F. Install grounding conductor in nonmetallic and flexible conduit to complete equipment ground continuity.
- G. Ground wire shall be bonded at equipment and at first junction box of conduit system on line side of flexible conduit to the system.
- H. Install grounding conductors to permit shortest and most direct path from equipment to ground.
- I. When grounding conductor runs through metallic conduit, bond to conduit at entrance and exit with a bolted clamp.
- J. Ground neutral at service only.
- K. Install a separate equipment grounding conductor in each conduit containing feeder conductors.
- L. Install a green equipment grounding conductor in all conduits serving branch circuits.
- M. Green ground bar in panels, where required to be similar to neutral bar, except tinted green and bonded to panel tub.
- N. Connections shall be accessible for inspection and checking.
- O. No insulation shall be installed over ground connections.
- P. Ground connection surfaces shall be cleaned and all connections shall be made so that it is impossible to move them.
- Q. Attach grounds permanently before permanent building service is energized.
- R. Ground metal lighting poles. Install a ground lug on inside wall of pole directly across from handhole.
- S. Install grounding and bonding in patient care areas to meet requirements of NFPA 99.
- T. Ground Busses:
 - 1. Mount to walls with insulated standoffs.
 - 2. At splice points, splice bus shall overlap busses being spliced with a dimension twice the width of the buss being spliced. Splice bus shall be connected to each bus with a minimum of two splice bolts.

3. Bus splice bolts shall utilize bellevue washers.

3.6 FIELD QUALITY CONTROL

- A. Division 01 – General Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13. Make final grounding system measurements two days after latest rainfall.
- D. Perform ground resistance testing in accordance with IEEE 142. Contractor shall make ground resistance measurements. Measure in normally dry conditions, not less than 48 hours after rainfall.
- E. Perform leakage current tests in accordance with NFPA 99.
- F. Perform continuity testing in accordance with IEEE 142.
- G. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Conduit.
2. Tubing.
3. Raceways.
4. Wireways.
5. Outlet Boxes.
6. Pull Boxes.
7. Junction Boxes.
8. Handholes.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 - Basic Electrical Requirements.
3. Section 26 05 02 – Electrical Wiring Methods.
4. Section 26 05 53 - Electrical Identification.

1.2 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).

B. National Electrical Manufacturers Association (NEMA):

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.3 SUBMITTALS

- A. Section 26 00 00 – Basic Electrical Requirements: Procedures for submittals.**

B. Product Data: Submit for product data following:

1. Flexible metal conduit.
2. Liquid-tight flexible metal conduit.
3. Nonmetallic conduit.
4. Flexible nonmetallic conduit.
5. Nonmetallic tubing.
6. Raceway fittings.
7. Conduit bodies.
8. Surface raceway.
9. Wireway.
10. Pull and junction boxes.
11. Handholes.

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements.

D. Include manufacturers' instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.4 CLOSEOUT SUBMITTALS

A. Division 01 – General Requirements: Procedures for closeout submittals.

B. Project Record Documents:

1. Record actual routing of conduits larger than 2 inch trade size (DN50).
2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and protect products under provisions of Division 01 – General Requirements.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.6 COORDINATION

A. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 1/2 inch unless otherwise specified.

2.2 METAL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Intermediate Metal Conduit (IMC) or Rigid Metal Conduit (RMC).
- C. Fittings and Conduit Bodies: NEMA FB 1; Fittings for metal raceways shall be steel or malleable iron and shall be zinc galvanized, or cadmium plated. Do not use aluminum or die cast fittings. Threaded and liquid tight.
- D. Box connector bushings shall have insulated throats. Integral grounding lugs shall be provided where required by code, where detailed on the Drawings, or required elsewhere in these specifications.

2.3 PVC COATED METAL CONDUIT

- A. Product Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil thick.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit, PVC gasketed for mating surfaces

2.4 FLEXIBLE METAL CONDUIT (FMC)

- A. Product Description: Interlocked steel construction.
- B. Fittings: NEMA FB 1. Threaded, grounding type, insulated throat, two screw clamp type with locknuts, externally secured.
- C. Minimum size 1/2 inch with the exception that 3/8 inch diameter may be used in lengths not to exceed 6 foot, to serve individual lighting fixtures installed in a suspended accessible ceiling system.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Product Description: Interlocked steel construction with PVC sunlight resistant jacket.
- B. Fittings: NEMA FB 1. Liquid tight, suitable for grounding, suitable for wet locations, tapered threaded hub, non-metallic materials.

2.6 ELECTRICAL METALLIC TUBING (EMT)

- A. Product Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression, threaded, insulated throat, gland compression type, rain and concrete tight type.

- C. Box connector bushings shall have insulated throats. Integral grounding lugs shall be provided where required by code, where detailed on the Drawings, or required elsewhere in these specifications.

2.7 NONMETALLIC CONDUIT

- A. Product Description: NEMA TC 2; Schedule 40 or 80 PVC, UL listed, and as required by NEC. Sunlight resistant.
- B. Rated for 90 degrees C. cable.
- C. Fittings and Conduit Bodies: NEMA TC 3, schedule 40 or 80, to match conduit.
- D. Expansion fittings. PVC material, Carlon series E945 or equivalent.
- E. Expansion straps. PVC material, Carlon series E978 or equivalent.

2.8 MULTI-CELL RIGID CONDUIT AND FITTINGS

- A. Outer duct shall be HW PVC or Rigid Metal Conduit as specified in Section 26 05 33 – Raceway and Boxes.
- B. Three cell schedule 40 factory installed inner ducts within 4 inches outer duct. Each cell shall have a diameter of approximately 1.50 inches.
- C. Inner ducts shall be PVC or nylon as required by Section 26 05 33 – Raceway and Boxes.
- D. Inner ducts shall be pre-lubricated.
- E. Outer markings to assist contractor in proper installation and alignment.
- F. Internal spacers to keep cells straight throughout the run.
- G. Use manufacturer’s transition adapters when connecting HW PVC outer duct sections to GRC outer duct sections.

2.9 EXPANSION FITTINGS

- A. Expansion fittings: Copper bonding jumper, Crouse-Hinds Type XJ.
- B. Expansion/deflection fittings: Copper bonding jumper, Crouse-Hinds Type XD.

2.10 SURFACE METAL RACEWAY

- A. Manufacturers:
 1. Carlon Electrical Products.
 2. Hubbell Wiring Devices.
 3. Thomas & Betts Corp.

4. Walker Systems Inc.
5. The Wiremold Co.

B. Product Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.

C. Size: As required per conductor fill and code.

D. Finish: Gray enamel.

E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories; match finish on raceway.

2.11 SURFACE NONMETAL RACEWAY

A. Manufacturers:

1. Carlon Electrical Products.
2. Hubbell Wiring Devices.
3. Thomas & Betts Corp.
4. Walker Systems Inc.
5. The Wiremold Co.
6. Panduit.

B. Product Description: Plastic channel with fitted cover, suitable for use as surface raceway.

C. Size: As required per conductor fill and code.

D. Finish: Gray.

E. Fittings, Boxes, and Extension Rings: Furnish manufacturers' standard accessories, finish to match raceway.

2.12 WIREWAY

A. Product Description: General purpose type wireway.

B. Knockouts: Manufacturer's standard.

C. Size: Cross sections and lengths as indicated on Drawings.

D. Cover: Hinged cover with full gaskets.

E. Connector: Slip-in.

F. Fittings: Lay-in type with removable top, bottom, and side; captive screws.

G. Finish: Rust inhibiting primer coating with gray enamel finish.

2.13 CONVENTIONAL DEVICE OUTLET BOXES FOR FLUSH DEVICES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish $\frac{1}{2}$ inch (13 mm) male fixture studs where required.
 - 2. Concrete Ceiling Boxes: Concrete type.
- B. Cast Boxes: NEMA FB 1, Type FD, cast fer alloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.
- C. Wall Plates for Finished Areas: As specified in Section 26 27 26 – Wiring Devices.
- D. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.14 PULL AND JUNCTION BOXES

- A. Outlet Boxes:
 - 1. Interior Wall Outlet Boxes – Flush Mounted: Stamped steel, four-inch square, $2\frac{1}{8}$ inch deep minimum, with square corners. Provide with raised device rings, height to match wall finish thickness. Mounting accessories. Larger width boxes shall be provided for ganging requirements indicated on drawings.
 - 2. Interior Wall Outlet Boxes – Surface Mounted – Dry Location: Stamped steel, four-inch square, $2\frac{1}{8}$ inch deep, with round corners. Provide rounded corner raised box covers with openings for devices being installed.
 - 3. Interior Wall Outlet Boxes – Surface Mounted – Damp or Wet Location: Cast malleable iron with threaded conduit hubs. Two inches deep minimum. Internal mounting ears. Boxes shall be coated with electroplated zinc, a dichromate coating, and an aluminum polymer enamel finish.
 - 4. Exterior Wall Outlet Boxes – Surface Mounted: Cast malleable iron with threaded conduit hubs. Two inches deep minimum. Internal mounting ears. Boxes shall be coated with electroplated zinc, a dichromate coating, and an aluminum polymer enamel finish.
 - 5. Ceiling Boxes – Flush Mounted – for Surface and Pendant Light Fixtures: Dropped ceiling construction. Stamped steel four-inch octagon box set flush with finished surface, with $\frac{3}{8}$ inch fixture stud.
 - 6. Cast in place concrete construction. Stamped steel four inch octagonal, galvanized concrete boxes having a minimum depth of 3 inches, with $\frac{3}{8}$ inch fixture stud.
 - 7. Electrical Boxes in Corrosive Locations: PVC coated cast steel boxes compatible with conduit system installed. Coating shall cover both interior and exterior surfaces. See floor plans for identification of corrosive areas.
- B. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- C. Hinged Enclosures: As specified in Section 26 27 16 – Cabinets and Enclosures.
- D. Surface Mounted Cast Metal Box: NEMA 250, Type 4X; flat-flanged, surface mounted junction box;
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

- E. In-Ground Cast Metal Box: NEMA 250, Type 6, inside flanged, recessed cover box for flush mounting:
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
 - 3. Cover Legend: "ELECTRIC".

- F. Polymer concrete composite Handholes: Die-molded, polymer concrete composite hand holes:
 - 1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.
 - 2. Cover: polymer concrete composite, weatherproof cover with nonskid finish. Secure cover with stainless steel hex bolts.

2.15 SEALS

- A. Link seal type as manufactured by Thunderline Corporation or equivalent as acceptable to Engineer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 EXISTING WORK

- A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.

- B. Remove concealed abandoned raceway to its source.

- C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

- D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

- E. Extend existing raceway and box installations using materials and methods compatible with existing electrical installations, or as specified.

- F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

- G. Cutting and Patching:
 - 1. Provisions for openings, holes, and clearances through walls, floors, ceilings, and partitions shall be made in advance of construction.
 - 2. Provide cutting and patching as necessary for installation of electrical systems, subject to approval of Owner.
 - 3. Contractor shall secure the approval of Owner for all anticipated floor sleeves for installation of electrical conduits in existing buildings, prior to starting any such work.

4. Contractor shall locate embedded conduits before core drilling in existing floors. Ground detector systems will be acceptable.
5. Patching of holes and openings resulting from work of this branch shall be responsibility of this Contractor. All painting of patched surfaces shall match existing paint color.

3.3 INSTALLATION

- A. Install Work in accordance with State and Municipality standards.
- B. All conduits containing service entrance conductors shall be rigid metal conduits.
- C. Ground and bond raceway and boxes in accordance with Section 26 05 26 – Grounding and Bonding.
- D. Identify raceway and boxes in accordance with Section 26 05 53 – Electrical Identification.
- E. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.4 GENERAL

- A. Split, crushed, or scarred raceways are not acceptable.
- B. Welded raceways are not acceptable.
- C. Raceways and boxes shall be located as indicated on the drawings and at other locations as required for splices, taps, wire pulling, equipment connections, and to comply with regulatory requirements.
- D. Raceways and boxes are shown at approximate locations unless dimensioned. Provide raceways as required to accommodate complete wiring systems.
- E. Raceways shall not be installed in floor slabs above grade or in floor topping slabs unless specifically indicated on the floor plans.
- F. Cut conduit square using saw or pipe cutter. De-burr cut ends.
- G. Bring raceways tight to shoulders of fittings. Fasten raceways securely to fittings.
- H. Join non-metallic raceways using cement as recommended by the raceway manufacturer. Wipe non-metallic conduit dry and clean before joining. Apply full, even coat of cement to entire area inserted in the fitting. Allow joint to cure for 20 minutes, minimum.
- I. Except for conduit sleeves or nipples, install suitable pull string or cord in each empty raceway.
- J. Provide suitable caps on empty raceways to protect against entrance of moisture, dirt, and other debris.
- K. Provide plugs in all unused openings in junction boxes, pullboxes, and wireways.

- L. Conduit runs that extend through areas of different temperatures or atmospheric conditions, or that are partly indoors and partly outdoors, shall be sealed, drained, and installed in a manner that will prevent drainage of condensed or entrapped moisture into cabinets, motors, or equipment enclosures.
- M. Install bushings with ground lugs and integral plastic linings at equipment with open bottom enclosures.

3.5 RACEWAY CONCEALMENT

- A. Unless specifically noted otherwise, raceways shall be routed concealed in finished spaces and shall not be visible at any point within the finished building space or from the building's exterior. This requirement also applies to new raceways in existing construction. Exceptions to this requirement are as follows:
 - 1. At the contractor's option, conduits may be installed embedded in or below basement floor slabs or slabs on grade.
 - 2. Conduits may be routed exposed in mechanical rooms and electrical rooms.
 - 3. Exposed raceways in finished spaces may be used on remodeling projects only where physically impossible to route concealed in existing construction. In those cases where exposed raceways are allowed, they shall be the equivalent of Wiremold 500 or 700 series as dictated by wiring quantities contained. In each case, specific raceway types and routings shall be submitted to the Architect for approval. Where allowed, general installation requirements are as follows;
- B. Raceways shall be routed horizontally along corners of walls and ceilings, above edges of base moldings at floors, or along tops of windows and door frames.
 - 1. Raceways shall be routed vertically along corners of adjacent walls and along edges of windows and door frames.
 - 2. Raceways shall not be routed down or across open wall surfaces except in portions of runs not exceeding 12 inches in length.
 - 3. Raceways shall be painted to match adjacent wall or ceiling surfaces. The EC shall be responsible for painting exposed electrical raceways.
- 4. Fittings and boxes used with surface raceways shall be specifically designed and approved for use with those raceways.

3.6 RACEWAY ROUTING

- A. Whether exposed to view or not, route interior raceways parallel to or perpendicular with major building elements such as walls, ceilings, and structural elements.
- B. Unless otherwise indicated on the drawings, raceways that are exterior to the building and direct buried, installed in or below grade level floor slabs, or installed in above grade floor slabs, or in floor topping slabs may be routed point to point using the shortest route possible.

- C. Do not route raceways over boilers, under boilers, or in floor slabs directly below boilers, incinerators, or other equipment that operates at higher than ambient temperatures. Maintain minimum 12-inch clearance between raceways and surfaces with temperatures exceeding 104° F.
- D. Where conduits must cross or follow the same path as water, steam, or other fluid piping, run electrical conduits above such piping wherever possible.
- E. Maintain clearance between raceways and piping for maintenance purposes.
- F. Install no more than the equivalent of three 90-degree bends between junction boxes. All conduit bends shall be made using published, industry approved methods and tools.
- G. At their option, contractor may install conduit bodies to make sharp changes in direction, such as around beams.
- H. Avoid moisture traps. At low points in interior conduit runs, install junction boxes with drain fittings.
- I. Install fittings to accommodate building expansion and deflection where raceways cross seismic, control, or expansion joints. Provide fittings with grounding jumper to maintain ground continuity.
- J. Raceways routed below basement floor slabs or below slabs on grade shall be coordinated with structural footings, thickened floor slabs, and all other architectural/structural elements. Raceways and the excavations required to install raceways, shall not negatively impact the integrity of floor slabs or the soils on which the structural elements rest.
- K. Raceways routed embedded in floor slabs shall be subject to quantity, size, and spacing limitations. These limitations shall be determined by the project's structural engineer. Contractor's wishing to embed raceways in floor slabs shall provide installation drawings to the Architect and structural engineer for review. Raceways shall only be installed embedded in concrete slabs using methods approved in writing by the structural engineer. The contractor shall not be entitled to compensation above their base bid for compliance with the requirements and restrictions of the structural engineer.

3.7 BUILDING EXTERIOR RACEWAYS – ABOVE GRADE

- A. Provide rigid metal conduit unless noted otherwise on the plans. Exceptions to this requirement are:
 - 1. Liquid-tight flexible metal conduit between 18 inches and 36 inches long shall be used for conduit connections at motors, transformers, and any other equipment that vibrates. Provide with connectors to assure liquid-tight, permanently grounded connections. Locate flexible connections so they will be subject to the least abuse. Use double locknuts and insulated bushings with threads full engaged

3.8 BUILDING EXTERIOR RACEWAYS – BELOW GRADE

- A. Within Five Feet of Building Basements or Perimeter Walls. Provide direct buried rigid metal conduit.
- B. Further Than Five Feet from Building Basements or Perimeter Walls. Provide direct buried schedule 40 non-metallic rigid conduit unless noted otherwise on the drawings.
- C. Exterior, underground, direct buried raceways shall be buried at a depth not less than 30 inches below final grade.
- D. Provide underground raceways terminating below grade with means to prevent entry of dirt or moisture.
- E. Underground raceways shall slope a minimum of $\frac{1}{8}$ inch per foot for proper drainage. Raceways shall drain towards manholes and junction boxes, not towards electrical equipment enclosures.
- F. Conduits embedded in concrete lighting fixture pole bases shall be Rigid Metal Conduit.

3.9 RACEWAYS BELOW BUILDING BASEMENT FLOOR SLABS ON GRADE WHERE RACEWAYS ARE IN DIRECT CONTACT WITH THE EARTH

- A. Provide schedule 40 non-metallic rigid conduit unless noted otherwise on the drawings. Provide rigid metal conduit elbows where such raceway runs penetrate on-grade floor slabs and are exposed to view inside the building.

3.10 NON-STANDARD INSTALLATIONS

- A. Covered Parking Structure Conduits
 1. Provide PVC fittings and PVC cement, which are compatible with the conduit being used and the installation temperature.
 2. Provide PVC expansion fittings in all exposed PVC conduit runs longer than 36 inches. Provide every 30 feet for runs longer than 30 feet. Expansion fittings shall have 6 inches of travel. Set expansion fittings for installed ambient temperature, half way at 50 degrees F.
 3. Provide special PVC expansion straps. Provide two fasteners at each strap. Conduit supports 3 feet on center maximum.
 4. Provide cast iron junction boxes to support light fixtures.

3.11 INSTALLATION - SURFACE RACEWAY

- A. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

- B. Where exposed raceways and electrical devices are required in existing construction, exposed raceway, fittings and boxes shall be used provided that installation meets following:
 - 1. Raceways shall be routed horizontally along corner surfaces formed by walls and ceilings, directly above edges of bases at floor, along tops of window mullions and door frames.
 - 2. Raceways shall be routed vertically along corners formed by adjacent walls and along edges of door frames.
 - 3. Surface raceways shall not be routed down or across open wall surfaces except in portions of runs not exceeding 12 inches in length.
 - 4. Surface raceways shall be painted to match wall finishes on which the raceways are routed. If wood backing is required, it shall be continuous and painted to match surrounding surfaces.
 - 5. If raceways are installed prior to painting, raceways will then be painted as part of painting contract.
 - 6. Fittings and boxes used with surface metal raceways shall be specifically designed and approved for use with such raceways.

3.12 INSTALLATION – BOXES

- A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.
- B. Adjust box location up to **10 feet** prior to rough-in to accommodate intended purpose.
- C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26 – Wiring Devices.
- D. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- E. In Accessible Ceiling Areas: Install outlet and junction boxes no more than **6 inches** from ceiling access panel or from removable recessed luminaire.
- F. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- G. Do not install flush mounting box back-to-back in walls; install with minimum **6 inches** separation. Install with minimum **24 inches** separation in acoustic rated walls.
- H. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- I. Install stamped steel bridges to fasten flush mounting outlet box between studs.
- J. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- K. Install adjustable steel channel fasteners for hung ceiling outlet box.
- L. Do not fasten boxes to ceiling support wires or other piping systems.
- M. Support boxes independently of conduit.

- N. Install gang box where more than one device is mounted together. Do not use sectional box.
- O. Install gang box with plaster ring for single device outlets.
- P. Provide cast metal boxes in pavement or sidewalks and nonmetallic handhole in grass areas, unless otherwise noted.
- Q. Install conduit hubs to fasten conduit to cast boxes in damp and wet locations.

3.13 INTERFACE WITH OTHER PRODUCTS

- A. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.
- B. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.14 ADJUSTING

- A. Division 01 - General Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused openings in boxes.

3.15 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nameplates.
2. Labels.
3. Wire markers.
4. Stencils.
5. Underground Warning Tape.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.

1.2 SUBMITTALS

A. Section 26 00 00 – Basic Electrical Requirements: Procedures for submittals.

B. Product Data:

1. Submit manufacturer's catalog literature for each product required.
2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

C. Samples:

1. Submit two tags, actual size.
2. Submit two labels, actual size.

D. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.3 CLOSEOUT SUBMITTALS

A. Division 01 – General Requirements: Procedures for closeout submittals.

B. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State and Municipality standards.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect products under provisions of Division 01 – General Requirements.
- B. Accept identification products on site in original containers. Inspect for damage.
- C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Division 01 – General Requirements: Environmental conditions affecting products on site.
- B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

1.8 EXTRA MATERIALS

- A. Furnish under provisions of Division 01 – General Requirements.

PART 2 - PRODUCTS

2.1 NAMEPLATES

- A. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color.
- B. Nameplates shall match identification shown on drawings.
- C. Letter Size:
 - 1. **3/8-inch** high letters for identifying voltages, phase and number of wires.
 - 2. **3/4-inch** high letters for identifying equipment and loads.
 - 3. Panelboards: Nameplates shall state: panel identification, voltage, phase and number of wires (example: LP1/BH1, 277/480V, 3PH, 4W).
 - 4. Medium voltage cables: nameplates shall be self-extinguishing, resistant to oil, water and solvents. Nameplate shall be minimum size 1 inch X 4 inches. Nameplate shall note: switch feeder from, phase, where feeder starts and where feeder ends.

D. Minimum nameplate thickness: **1/8 inch**.

2.2 LABELS

A. Labels: Printed adhesive label tags, with **1/8-inch minimum height** black letters on white background.

B. Wiring device labels: Printed adhesive label tags, with **1/8-inch minimum height** black letters on clear background.

2.3 WIRE AND CABLE IDENTIFICATION

A. Different conductor insulation colors and electrical tape colors shall be used to identify the different phases of conductors in a given circuit.

B. Branch wiring shall be color coded per industry standards. If Owner does not have a pre-established color code, use the following colors unless otherwise required by code.

C. Code color requirements shall always be followed where applicable.

D. Following colors shall be as follows unless otherwise required by code:

1. 120/208 volt systems
 - a. A-phase: solid black.
 - b. B-phase: solid red.
 - c. C-phase: solid blue.
 - d. Different colors shall be used to identify switched legs.
 - e. Neutral conductor: solid white. Provide additional markings for neutral conductors in the same raceway as required by code.
2. Ground Conductors: solid green. Provide additional markings for ground conductors in the same raceway as required by code.
3. For additions to existing buildings use existing color code system unless it violates code. If no wire color coding system is used; use color coding system listed above.

E. Where wires of different systems junction in a common box, each cable shall be grouped with its own system and identified using tags or identification strips.

F. For 3 phase systems, each phase shall be identified at all terminals using cable markers.

G. Wire and cable labels:

1. Feeder and branch circuits: label shall indicate panel and circuit number as actually installed.
2. Control Circuits: Control wire number as indicated on shop drawings.

2.4 CONDUIT AND RACEWAY MARKERS

A. Conduit color/stencil markings:

1. Medium Voltage System: Orange lettering on white background noting: **HIGH VOLTAGE - "actual line-to-line voltage"**.
2. 480 Volt System: Yellow color band.

3. 208 Volt System: Blue color band.
4. Fire Alarm System: Red colored band.
5. Telephone/Data System: Gray colored band.

2.5 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
1. Up to **2 inches** Outside Diameter of Raceway: **1/2-inch** high letters.
 2. **2-1/2 to 6 inches** Outside Diameter of Raceway: **1 inch** high letters.
 3. **1/2-inch** high letters minimum for identifying boxes and other equipment.

2.6 UNDERGROUND WARNING TAPE

- A. Description: **4-inch** wide plastic tape, colored yellow with suitable warning legend describing type of buried electrical lines.

2.7 PANELBOARD DIRECTORIES

- A. Suitable for complete description of load served
- B. Directory shall be removable.
- C. Typewritten card, describing loads served.
- D. Provide steel frame holder on inside cover of door to hold directory.
- E. Directory shall be covered with a clear plastic sheet.

PART 3 - EXECUTION

3.1 GENERAL

- A. Where mixed voltages are used in one building (e.g. 4160 volt, 480 volt, 208 volt) each switch, switchboard, junction box, equipment, etc., on each system must be labeled for voltage in addition to the other requirements listed herein.
- B. All branch circuit and power panels must be identified with the same symbol used in circuit directory in main distribution center.
- C. Stenciling may only be used on equipment fronts in unfinished areas.
- D. Receptacle labels shall identify panel and circuit number feeding receptacle.
- E. Switch label shall indicate equipment controlled by switch. Do not label light switches unless otherwise noted on drawings.

3.2 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.3 EXISTING WORK

- A. Install identification on existing equipment to remain in accordance with this section.
- B. Re-stencil existing equipment.

3.4 INSTALLATION

- A. Install identifying devices after completion of painting.
- B. Adhesive type labels not permitted except for phase and wire identification.
- C. Hand written labels or embossed tape are not permitted.
- D. Entrance door to primary electrical room shall have porcelain enameled sign lettered "DANGER HIGH VOLTAGE". This same sign shall also be placed on primary switch.
- E. Each distribution and lighting panel shall be equipped with typewritten directory describing loads served. Directory shall be contained in steel frame mounted on inside face of panel's door and shall be covered with sheet of clear plastic.
- F. Switchboards, transformers, switchgear, telephone backboards, transfer switches, panels and cabinets shall be provided with 1/8-inch minimum thickness 5 ply lamecoid plastic nameplates indicating usage, plan designation and voltage where applicable. In Equipment and Mechanical Rooms, this identification may be on exterior of unit, in other areas identification shall be inside door or cover. Nameplates shall be black with white engraved lettering. Lettering shall be 1/2-inch high minimum. Fasten nameplates with escutcheon pins.
- G. Junction and pullboxes smaller than 12 inch x 12 inch shall be identified by using permanent marker on coverplate indicating originating panelboard and circuit(s) or system served.
- H. Junction and pull boxes with dimensions 12 inch x 12 inch and larger shall be stenciled or provided with permanent labels as follows:
 1. Lighting and power feeders and branch circuits - 120, 208, 277, 480. Add "EM" for emergency circuits, ex. 120EM, etc.
 2. Medium voltage feeders - 5KV, 15KV, etc. as applicable for system voltage.
 3. Clock - CLK.
 4. Voice/Data communications - V/D COM.
 5. Fire Alarm - FA.
 6. Signal voltage lighting controls - LVLC.
 7. Area of rescue assistance system - RA.
 8. Master Antenna Television System - MATV.
 9. Nurse call system - NC.
 10. Building paging system - PA.

11. Electronic Card Key Access System - CA.
 - I. Cover plates for control stations controlling remote equipment shall be engraved to identify device being controlled.
 - J. Motor starters, remote control stations, etc., shall be identified with engraved lamecoid nameplates fastened to equipment with escutcheon pins. Nameplates shall be 1/8 -inch 5 ply lamecoid with 1/4-inch white letters on a black background. Adhesive cloth labels, similar to those manufactured by Brady Label Co., may be used on motor switches and controls only, indicating number, designation, size and usage of motor.
 - K. On inside of coverplates for light switches, occupancy sensors, receptacles, and special purpose outlets, provide a permanent label identifying panel and circuit number feeding device. Adhesive plastic tape will be permitted for this use.
 - L. On light fixtures at wiring entrance point, provide permanent label identifying panel and circuit number feeding fixture. Adhesive plastic tape will be permitted for this use.
 - M. Refer to individual specification sections for more specific or additional identification requirements.
 - N. Nameplate Installation:
 1. Install nameplate parallel to equipment lines.
 2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners.
 3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners.
 4. Secure nameplate to equipment front using screws or rivets.
 5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
 6. Provide identification for the following:
 - a. Conduit (provide stencil or color band).
 - b. Wires and cables (provide Color code and label).
 - c. Junction and pullboxes (provide color code and/or stencil).
 - d. Wiring devices (provide label).
 - e. Equipment (provide nameplates).
 - f. Panelboards (provide nameplates and directory).
 - g. Transformers (provide nameplates).
 - h. Motor starters (provide nameplates).
 - i. Control panels (provide nameplates).
 - j. Time contactor (provide nameplates).
 - k. Contactor (provide nameplates).
 - l. Disconnect switch (provide nameplates).
 - O. Label Installation:
 1. Install label parallel to equipment lines.
 2. Install label for identification of individual control device stations.
 3. Install labels for permanent adhesion.

P. Wire label Installation:

1. Install wire marker for each conductor at panelboard gutters and outlet or equipment connection. Label shall be within one (1) foot of end of conductor.

Q. Conduit Marker Installation:

1. Install conduit marker for each conduit longer than **6 feet**.
2. Conduit Markers Spacing: **50 feet** on center, minimum of one visible in every room.

R. Stencil Installation:

1. Junction boxes: identify system source and load served.
2. Junction boxes for electrical communications, signal and control systems: Identify system source and equipment serviced, stenciled in black on cover.
3. Junction boxes for Fire Alarm system: Junction box covers shall be painted red with "Fire Alarm" stenciled in black on cover.

S. Underground Warning Tape Installation:

1. Install underground warning tape along length of each underground conduit, raceway, or cable **6 to 8 inches** below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION

SECTION 26 09 43

NETWORKED LIGHTING CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Networked lighting control system and components.

B. Related Sections:

1. Applicable provisions of Division 01 shall govern all work under this Section.
2. Section 26 05 03 - Wiring Connections: Execution requirements for electric connections specified by this section.
3. Section 26 05 33 - Raceway and Boxes: Product requirements for raceway and boxes for placement by this section.
4. Section 26 05 53 – Electrical Identification: Product requirements for electrical identification items for placement by this section.
5. Section 26 27 26 - Wiring Devices: Product requirements for wiring devices for placement by this section.

1.2 REFERENCES

- A. Government Electronics and Information Technology Association (EIA): EIA 709.1 - Control Network Protocol Specification.
- B. National Electrical Manufacturers Association (NEMA): NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code.
- D. Underwriters Laboratories Inc. (UL):
 1. UL 50 - Enclosures for Electrical Equipment.
 2. UL 67 - Panelboards.
 3. UL 508 - Industrial Control Equipment.
 4. UL 916 - Energy Management Equipment.

1.3 SYSTEM DESCRIPTION

- A. Provide networked lighting control system consisting of components manufactured by single source.
- B. Provide networked lighting control system consisting of:
 1. Multiple relay panels linked over network wiring using open protocol for communications.
 2. Multiple relay panels linked over network wiring using open protocol for communications, and be fully compliant with EIA 709.1.

3. Relay panels and programmable switches connected together by networked wiring system extending from panel locations with single communications bus to allow switches to communicate with panels.
4. System connected to single time clock mounted in interior of relay panel.

1.4 SUBMITTALS

- A. Section 26 00 00 – Basic Electrical Requirements: Requirements for submittals.
- B. Shop Drawings: Indicate dimensioned drawings of lighting control system components and accessories.
 1. One Line Diagram: Indicating system configuration indicating panels, number and type of switches, data line, and network time clock.
 2. Drawings for each panel showing hardware configuration and numbering.
 3. Panel wiring schedules.
 4. Include typical wiring diagrams for each component.
- C. Product Data: Submit manufacturer's standard product data for each system component.
- D. Manufacturer's Installation Instructions: Submit for each system component.
- E. Manufacturer's Certificate: Certify Products meet or exceeds specifications. Submit in writing system has been installed, adjusted, and tested in accordance with manufacturer's recommendations.
- F. Manufacturer's Field Reports: Submit system startup report indicating date of completion and acknowledgment of programming completion. Indicate acceptance of component and equipment installation, interconnecting wiring, and start-up of system software.

1.5 CLOSEOUT SUBMITTALS

- A. Division 01 – General Requirements: Requirements for submittals.
- B. Project Record Documents: Record the following information:
 1. Wiring diagrams reflecting field installed conditions with identified and numbered system components and devices.
 2. Drawings for each panel showing hardware configuration and numbering.
- C. Operation and Maintenance Data:
 1. Submit manufacturer's published installation instructions, operating instructions, programming instructions, and operator's guide.
 2. System user's guide and programmer's guide.
 3. Instruction books and manufacturer's printed materials.
 4. Recommended renewal parts list.

1.6 QUALITY ASSURANCE

- A. Comply with NFPA 70 as applicable to electrical wiring work.

- B. Comply with NEMA 250 for type of electrical equipment enclosures.
- C. Provide panelboards with UL listing in accordance with UL 50, UL 67, and UL 916.
- D. Provide equipment complying with FCC emissions' standards in part 15 subpart J for Class A application.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing lighting control system listed in this section, with minimum five (5) years experience.
- B. Installer: Company specializing in performing work of this section with minimum five years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Division 01 – General Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept system components on site in manufacturer's packaging. Inspect for damage.
- C. Protect components by storing in manufacturer's containers indoor protected from weather.

1.9 WARRANTY

- A. Division 01 – General Requirements: Requirements for warranties.

PART 2 - PRODUCTS

2.1 NETWORKED LIGHTING CONTROL SYSTEM

- A. Manufacturers:
 - 1. Acuity Brands – nLight System/LC&D/Blue Box
 - 2. Wattstopper
 - 3. Lutron
 - 4. Other as approved by Engineer
- B. Product Description: Networked lighting control system consisting of the following components: relay panels, network wiring, programmable network wired switches, programmable clock, software, and capability of integration into building automation system.

2.2 RELAY PANELS

- A. UL listed, NEMA 1 enclosure sized to accept up to number of relays indicated on the relay cabinet schedules.

- B. Power Supply: Transformer assembly with two 40 VA transformers with separate secondaries. Transformers include internal overcurrent protection with automatic reset and metal oxide varistor protection against power line spikes.
- C. Voltage: 120 or 277 VAC, 60 Hertz, plus or minus 10 percent.
- D. Mounting: Surface or Flush as indicated on the plans.
- E. Cover: Hinged, locking configuration with wiring schedule directory card.
- F. Interior: Bracket and intelligence board backplane with factory mounted and tested relays.
- G. Furnish with integral DIN rail mounting bar to allow for installation of system components. Furnish terminals to accept network wiring for connection of switches to system, or to allow network wiring to be run between multiple panels for network communications between panels.
- H. Furnish with individual on-off switches for both panel and network wiring power.
- I. Furnish 8 channels in each interior regardless of size, each with associated pushbutton to toggle channel on-off, and terminal block for separate dry contact input. Each relay in panel capable of being assigned to each channel, with overlapping allowed. Furnish each channel pushbutton with LED state indication.
- J. Furnish each channel pushbutton with LED status indication.
- K. Relays:
 - 1. Type: Momentary-pulsed mechanically latching contactors rated at 20 amps, 120 to 277 VAC attached to interior by plug-in type connector.
 - 2. Locate next to each relay individual override button and LED to indicate status - relay on, relay off, or relay failure.
 - 3. One 0-10 volt dimming output per relay.
 - 4. Furnish screw terminations for each wiring connection.
 - 5. Furnish each channel button's dry control contact input terminal with capability of accepting 2 or 3 wire, maintained or momentary inputs and 2 wire toggling input.
 - 6. Furnish each channel with isolated contact for use with status feedback or pilot light control.
 - 7. Relay Panel records channel wiring assignments and current status of each relay, in non-volatile memory to prevent data loss on power failure.
 - 8. Furnish LED status indication of power supply status. Furnish access to 24 VAC and 24 V rectified power for accessory devices within panel.
 - 9. Interior uses relays with pilot contact to provide individual relay feedback.
 - 10. Switching devices to control relay state. Devices can be either 2 or 3 wire, maintained or momentary inputs. Devices also accept 2 wire toggling input.
 - 11. System to comply with EIA 709.1 lighting controller profile and furnish capability for network connecting to EIA 709.1 compliant building automation system components without use of dry contacts, gateways, protocol converters or additional devices.

- L. Inputs.
 - 1. One programmable input for contact closure or photo-sensor signal.
 - 2. One input for every 8 relays.
 - 3. One maintained over-ride input.

2.3 NETWORK WIRING

- A. CAT 5e cables, T568B wiring convention
- B. Maximum length: 1,500 feet.
- C. Maximum number of devices: 128 per control zone.

2.4 PROGRAMMABLE NETWORK WIRED SWITCHES

- A. Function: Allow individual controls.
- B. Multiple pushbuttons will comprise a single switch station location. Pushbuttons may consist of;
 - 1. On.
 - 2. Off.
 - 3. On/Off Toggle.
 - 4. Raise.
 - 5. Lower.
 - 6. Numbered for Scene Select.
- C. Configurations: As indicated on the Drawings.
- D. Configured to mount in a single gang box opening.
- E. Shall contain RJ-45 network ports for communications cabling terminations/bus connection.
- F. Features:
 - 1. Equipped with bi-color LED pilot light for individual buttons to indicate status of controlled relay or group of relays.
 - 2. Equipped with locator light.
 - 3. Furnish individual buttons with removable clear cover for labeling controlled loads.
- G. White buttons and white cover-plates.
- H. Acuity nPODM series.

2.5 PROGRAMMABLE CLOCK

- A. From each plug-in point on network wiring, time clock can be used to:
 - 1. Schedule each 8 channel groups in relay panel network.
 - 2. Program network wired switches.

- B. Includes user selectable functions to handle standard lighting control functions for each channel independently. Selectable functions include:
 - 1. Scheduled on and scheduled off.
 - 2. Manual on and scheduled off.
 - 3. Astronomical on and astronomical off with optional offset.
 - 4. Astronomical on and scheduled off with optional offset.
- C. Each channel capable of being assigned the following:
 - 1. Time delay from 1 to 256 minutes.
 - 2. Automatic blinking of lights before turning off to allow occupants opportunity to enter override. Time interval configurable.
- D. Features:
 - 1. Furnish clock with display and user interface.
 - 2. Capable of being adjusted for leap year, daylight savings dates, and holidays.

2.6 SOFTWARE

- A. Furnish plug-in capability for use in system commissioning, programming, monitoring, and control. Software capable of functioning with EIA 709.1 compliant network tool.
- B. After programming of system parameters is completed, system allows each user-definable feature such as schedules, relay groups, switch assignments to be field modified without need for configuration software or system integration expertise.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount switches, occupancy sensors and photocells as indicated on the Drawings.
- B. Label each low voltage wire clearly indicating connecting relay panel. Refer to Section 26 05 53 – Electrical Identification.
- C. Use only properly color coded, stranded wire. Install wire sizes as indicated on the Drawings.
- D. Mount relay panels as indicated on the Drawings. Wire numbered relays in panel to control power to each load.
- E. Identify power wiring with circuit breaker number controlling load. When multiple circuit breaker panels are feeding into relay panel, label wires to clearly indicate originating panel's designation.
- F. Terminate communication conductors and associated conduits external to factory supplied equipment.
- G. Test relays and switches after installation to confirm proper operation.

- H. Label each low voltage wire with relay number at each switch or sensor.
- I. Install wiring schedule directory card affixed to rear of panel cover to identify circuits, relays, and loads controlled.

3.2 FIELD QUALITY CONTROL

- A. Test relays and switches after installation to confirm proper operation and confirm correct loads are recorded on directory card in each panel.

3.3 MANUFACTURER'S FIELD SERVICES

- A. System Startup: Furnish manufacturer trained, factory authorized technician to confirm proper installation and operation of system components.
- B. Programming:
 - 1. Furnish services of factory trained representative to perform programming of system. Assist Owner's personnel in developing control scenario for each application. Program Owner furnished control scenario.
 - 2. Explain operation of control programs to Owner and conduct demonstration of project.
 - 3. Include a minimum of 24 hours of Owner training on the system functions and programming.

3.4 ADJUSTING

- A. Division 01 – General Requirements: Requirements for starting and adjusting.
- B. Furnish factory trained technicians to functionally test each system component after installation to verify proper operation.

3.5 DEMONSTRATION

- A. Demonstrate operation of the following system components:
 - 1. Index system to occupied cycle and unoccupied cycle.
 - 2. Operation of switches.
 - 3. Operation of each type of occupancy sensors.
 - 4. Operation of each type of photocell.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Branch Circuit Panelboards.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.
3. Section 26 05 26 – Grounding and Bonding.
4. Section 26 05 53 – Electrical Identification.

1.2 REFERENCES

A. Institute of Electrical and Electronic Engineers (IEEE):

1. IEEE C62.41 – Recommended Practice on Surge Voltages in Low Voltage AC Power Circuits.

B. National Electrical Manufacturers Association (NEMA):

1. NEMA AB 1 – Molded Case Circuit Breakers and Molded Case Switches.
2. NEMA KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
3. NEMA PB 1 – Panelboards.
4. NEMA PB 1.1 – General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

C. International Electrical Testing Association (NETA):

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code.

E. Underwriters Laboratories Inc. (UL):

1. UL 67 - Safety for Panelboards.

1.3 SUBMITTALS

- A. Section 26 00 00 – Basic Electrical Requirements, Division 01 – General Requirements:
Procedures for submittals.**

- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.
- C. Product Data: Submit catalog data showing specified features of standard products.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
- B. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years' experience.

1.6 MAINTENANCE MATERIALS

- A. Furnish two of each panelboard key. Panelboards shall be keyed alike.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Do not store panelboards exposed to weather.
- B. Protect panelboards against damage from work of other trades.

PART 2 - PRODUCTS

2.1 BRANCH CIRCUIT PANELBOARDS

- A. Manufacturers:
 - 1. Square D, NQOD or NF Series.
 - 2. GE Electrical.
 - 3. Siemens.
 - 4. Cutler-Hammer.
 - 5. Equivalent as acceptable to Engineer.
- B. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- C. Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings, 100 amp minimum. Furnish copper ground bus in each panelboard.
- D. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical for 208 volt or 240 volt panelboards; 14,000 amperes rms symmetrical for 480 volt panelboards, unless otherwise indicated on Drawings. Panels shall be fully rated, series rating is not acceptable.

- E. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles; no handle ties of any sort will be approved. Type HACR for air conditioning equipment circuits, HID rated for high intensity discharge lighting systems, or as indicated on Drawings.
- F. Provide metal directory holders with clear plastic covers.
- G. Do not use tandem circuit breakers.
- H. Enclosure: NEMA PB 1, Type 1 indoors, Type 3R outdoors and damp or wet locations.
- I. Cabinet Box: 6 inches deep, 20 inches (508 mm) wide.
- J. Furnish wiring gutters in accordance with NEC.
- K. Top or bottom feed as required.
- L. Furnish with branch breaker positions and nominal current rating as indicated on Drawings.
- M. Fronts:
 - 1. Dead front safety type.
 - 2. Door shall be built into panel front cover trim which allows access to breakers as well as to trim screw fasteners. Front cover construction with concealed trim screws and door hinges. Breaker access door shall have the following features:
 - a. Concealed piano hinge.
 - b. Flush stainless steel cylinder tumbler type lock with spring loaded door pulls.
 - c. Locks keyed alike.
 - d. Code gauge steel with rust inhibiting primer and baked enamel finish.
- N. Circuit Directory:
 - 1. Suitable for complete descriptions.
 - 2. Clear plastic cover.
 - 3. Typewritten card, describing the loads served.
 - 4. Provide steel frame holder on inside cover of door to hold directory. Directory shall be covered with a sheet of clear plastic.

PART 3 - EXECUTION

3.1 EXISTING WORK

- A. Maintain access to existing panelboard remaining active and requiring access. Modify installation or provide access panel.
- B. Clean and repair existing panelboards to remain or to be reinstalled.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's written instruction, applicable requirements of NEC, NECA's "Standard of Installation," NEMA PB1.1, and in accordance with recognized industry practices.
- B. Install flush or surface mounted as specified on drawings and schedules.
- C. Support panel cabinets independently to structure with no weight bearing on conduits.
- D. Install recessed panelboards to allow cover to be drawn tight against wall to provide neat appearance.
- E. Install surface mounted panelboard interior so there is no gap between the panelboard back-box and cover.
- F. Adjacent panel cabinets shall be of same size and mounted in horizontal alignment.
- G. Attach nameplates. Nameplates for panels in public areas shall be attached to the inside face of the cover. Nameplates for panels in equipment rooms and other non-public areas shall be attached to the outside face of the cover.
- H. Install panelboards plumb.
- I. Height: **6 feet** to top of panelboard; install panelboards taller than **6 feet** with bottom no more than **4 inches** above floor.
- J. Install filler plates for unused spaces in panelboards.
- K. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.
- L. Install engraved plastic nameplates in accordance with Section 26 05 53 – Electrical Identification.
- M. Install spare conduits out of each recessed panelboard to accessible location: (2) 1 inch to above ceiling, (2) 1 inch to floor below. Identify each as SPARE.
- N. Ground and bond panelboard enclosure according to Section 26 05 26 – Grounding and Bonding. Connect equipment ground bars of panels in accordance with NFPA 70.

3.3 FIELD QUALITY CONTROL

- A. Section 26 00 00 – Basic Electrical Requirements, Division 01 – General Requirements: Field inspecting, testing, adjusting, and balancing.

3.4 INSPECTION

- A. Examine area to receive new panelboards to assure adequate clearance for installation.
- B. Start work only after unsatisfactory conditions are corrected.

3.5 ADJUSTING

- A. Adjust doors and operating mechanisms for free mechanical movement.
- B. Tighten lugs and bus connections.
- C. Clean interior of panelboard.
- D. Sand, prime and paint scratched or marred surfaces to match original finish.
- E. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 26 27 16

CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Section includes hinged cover enclosures, cabinets, terminal blocks, and accessories.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.

1.2 REFERENCES

A. National Electrical Manufacturers Association (NEMA):

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 SUBMITTALS

**A. Section 26 00 00 – Basic Electrical Requirements, Division 01 – General Requirements:
Procedures for submittals.**

B. Product Data: Submit manufacturer's standard data for enclosures, cabinets, and terminal blocks.

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five years documented experience.

1.5 EXTRA MATERIALS

A. Furnish under provisions of Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements.

B. Furnish two of each key.

PART 2 - PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250, Type steel enclosure.
- B. Covers: Continuous hinge, held closed by hasp and staple for padlock.
- C. Furnish interior plywood panel for mounting terminal blocks and electrical components; finish with white enamel.
- D. Enclosure Finish: Manufacturer's standard enamel (to be verified with Owner).

2.2 CABINETS

- A. Boxes: Painted steel.
- B. Box Size: 37 inches wide x 72 inches high x 24 inches deep.
- C. Backboard: Furnish 3/4-inch thick plywood backboard for mounting terminal blocks. Paint with two coats of flat white paint.
- D. Fronts: Steel, surface type, door with hinge, and pad lock capable. Finish with gray baked enamel (to be verified with Owner).
- E. Furnish metal barriers to form separate compartments wiring of different systems and voltages.
- F. Furnish accessory feet for free-standing equipment.

2.3 TERMINAL BLOCKS

- A. Terminal Blocks: NEMA ICS 4.
- B. Power Terminals: Unit construction type with closed back and tubular pressure screw connectors, rated 600 volts.
- C. Signal and Control Terminals: Modular construction type, suitable for channel mounting, with tubular pressure screw connectors, rated 300 volts.
- D. Furnish ground bus terminal block, with each connector bonded to enclosure.

2.4 PLASTIC WIRE MANAGEMENT RACEWAY

- A. Product Description: Plastic channel with hinged or snap-on cover.

PART 3 - EXECUTION

3.1 EXISTING WORK

- A. Remove abandoned cabinets and enclosures, including abandoned cabinets and enclosures above accessible ceiling finishes. Patch surfaces.
- B. Maintain access to existing cabinets and enclosures and other installations remaining active and requiring access. Modify installation or provide access panel.
- C. Extend existing cabinets and enclosures using materials and methods compatible with existing electrical installations, or as specified.
- D. Clean and repair existing cabinets and enclosures to remain or to be reinstalled.

3.2 INSTALLATION

- A. Install enclosures and boxes plumb. Anchor securely to concrete pad at each corner.
- B. Install cabinet fronts plumb.

3.3 CLEANING

- A. Section 26 00 00 – Basic Electrical Requirements, Division 01 – General Requirements: Requirements for cleaning.
- B. Clean electrical parts to remove conductive and harmful materials.
- C. Remove dirt and debris from enclosure.
- D. Clean finishes and touch up damage.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Switches
2. Receptacles.
3. Multi-Outlet Assembly.

B. Related Sections:

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 05 33 - Raceway and Boxes.

1.2 REFERENCES

A. National Electrical Manufacturers Association (NEMA):

1. NEMA WD 1 - General Requirements for Wiring Devices.
2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

A. Section 26 00 00 – Basic Electrical Requirements: Procedures for submittals.

B. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide all wiring device types from a single manufacturer.

1. Use of a manufacturer's name and model or catalog number is for purpose of establishing standard of quality and general configuration desired.

B. Devices and Cover Plate Colors:

1. Device colors shall be white, unless noted otherwise.
2. Unless noted otherwise, receptacles and light switches controlling emergency or critical loads shall be red in color.

3. Adjustments in device or cover plate color shall be made in the field without additional compensation.

C. Unless otherwise indicated acceptable manufacturers are:

1. Hubbell.
2. Leviton.
3. Arrow-Hart, Inc.
4. Pass & Seymour.

2.2 WALL SWITCHES

A. Switches:

1. Single Pole Switch: 20 amps, 120-277 volt, specification grade, back or side wired equal to Hubbell cat. No. HBL1221.
2. Double Pole Switch: 20 amp, 120-277 volt, specification grade, back or side wired equal to Hubbell cat. No. HBL1222.
3. Pilot Light (lighted) - Single Pole Switch: 20 amp, 120-277 volt, specification grade, clear polycarbonate toggle, back or side wired equal to Hubbell cat. No. HBL1221ILC.
4. Momentary Contact Switch: 20 amps, 120-277 volt, specification grade, back or side wired, three positions, center off equal to Hubbell cat. No. HBL1557.

2.3 WALL DIMMERS

A. Manufacturers:

1. Leviton.
2. Lutron.
3. Pass & Seymour.

B. Product Description: NEMA WD 1, Type I, semiconductor dimmer with ON-OFF switch independent of brightness setting for incandescent lamps.

C. Body and Handle: Plastic with linear slide. Device colors shall be white unless noted otherwise.

D. Voltage: 120/277 volts.

E. Power Rating: Dimmers shall be derated 25 percent to allow next size larger lamp to be installed in lighting fixtures controlled by dimmer, 1000 watts minimum.

F. Accessory Wall Switch: Match dimmer appearance.

2.4 RECEPTACLES

A. General:

1. Receptacles shall be flush mounted.
2. Receptacles shall have full grounding straps and be suitable for side or side and back wiring.
3. Receptacles shall be Hubbell Nos. listed below or equal by approved manufacturer.
4. Unless noted otherwise, receptacles shall be 125 volt, 2 pole, 3 wire grounding.
5. Device colors shall be white, unless noted otherwise.

B. Receptacles

1. Single Convenience Receptacle Where a single receptacle is wired to a dedicated 20 ampere: heavy duty, specification grade, 20 amp, 125 volt, NEMA 5-20R Hubbell cat. No. HBL5361.
2. General use Duplex Convenience Receptacle: heavy duty, specification grade, 15 amp, 125 volt, NEMA 5-15R Hubbell cat. No. HBL5262.
3. Duplex Receptacle Where a single duplex receptacle is wired to a dedicated 20 ampere: heavy duty, specification grade, 20 amp, 125 volt, NEMA 5-20R Hubbell cat. No. 5362.
4. Tamper-Resistant: Commercial specification grade, 20 amp Duplex, 125 volt, NEMA 5-20R, Hubbell cat. No. BR20TR.
5. Weather-Resistant: Corrosion resistant heavy duty, specification grade, 20 amp duplex, 125 volt, NEMA 5-20R, HBL53CM62 (Color – Yellow)
6. GFCI Receptacle: heavy duty, specification grade, self-testing, 20 amp, 125 volt, NEMA 5-20R, UL 2006 compliant, Hubbell cat. No. GFST20.
7. Tamper-Resistant GFCI: Heavy duty commercial grade, 20 amp duplex, 125 volt, NEMA 5-20R, UL 2006 compliant, Hubbell cat. No. GFTR20.
8. Weather-Resistant GFCI: Extra heavy duty grade, 20 amp duplex, 125 volt, NEMA 5-20R, UL 2006 compliant, Hubbell cat. No. GFR5362.
9. Isolated ground duplex receptacle: Orange, heavy duty, specification grade, 20 amp, 125 volt, NEMA 5-20R Hubbell cat. No. IG5362.

C. Weatherproof Cover Plate: Gasketed die cast metal plate with hinged and gasketed device covers. Cover shall allow cords to be plugged in and cover closed. Provide Intermatic WP1010MC for single duplex receptacles or WP1030MC for double (quad) duplex receptacles.

D. Receptacles fed from emergency circuits shall be red.

2.5 SPECIAL PURPOSE OUTLETS

A. Refer to “Special Outlet Schedule” on Drawings.

B. Electrical Contractor shall be responsible for coordinating the following items with actual equipment being furnished for the project prior to installation of outlet.

1. Exact location and orientation of outlet. Field coordinate location of outlet with Engineer/Architect’s field representative, location shall not be scaled off electrical drawings.
2. Electrical characteristics of equipment, including voltage, phasing, ampacity, etc.
3. Physical characteristics of termination, e.g. receptacle configuration, cord-and-plug versus hard-wired equipment, etc.

2.6 MULTIOUTLET ASSEMBLY

A. Manufacturers:

1. Wiremold.
2. Hubbell.
3. Panduit.

B. Multi-outlet Assembly: Sheet metal channel with fitted cover, with pre-wired receptacles, suitable for use as multi-outlet assembly.

- C. Size: As indicated on Drawings.
- D. Receptacles: Furnish covers and accessories to accept convenience receptacles specified in this Section.
- E. Receptacles: NEMA WD 6, type 5-20R, duplex receptacle.
- F. Receptacle Spacing: As indicated on Drawings or as required.
- G. Receptacle Color: Coordinate with the Architect.
- H. Channel Finish: Ivory enamel.
- I. Fittings: Furnish manufacturer's standard couplings, elbows, outlet and device boxes, and connectors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and completely covered by wall plates.
- C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Clean debris from outlet boxes.

3.3 EXISTING WORK

- A. Disconnect and remove abandoned wiring devices.
- B. Modify installation to maintain access to existing wiring devices to remain active.
- C. Clean and repair existing wiring devices to remain or to be reinstalled.

3.4 INSTALLATION

- A. Switches controlling equipment operation of which is not evident from switch position shall include pilot light in conjunction with proper switch.
- B. Each switch shall be complete with engraved plate to identify equipment being controlled. Provide black letters on clear background, 1/8-inch high, minimum.
- C. Do not install devices until after wall finishes have been completely applied.

- D. Any outlets installed prior to walls being finished and used for construction power shall be replaced at time of substantial completion.
- E. Install devices and wall plates plumb and level.
- F. Install switches with OFF position down.
- G. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- H. Do not share neutral conductor on load side of dimmers.
- I. Install receptacles with grounding pole on top.
- J. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.
- K. Route continuous green equipment grounding conductor with branch circuit conductors serving isolated ground receptacles. Terminate equipment ground on isolated ground bus in panelboards.
- L. Install emergency switches, which occur adjacent to normal light switches in separate boxes to maintain systems isolation in accordance with the NEC.
- M. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- N. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller.
- O. When stranded conductors are used in lieu of solid, use crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.
- P. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- Q. Do not use terminals on wiring devices (hot or neutral) for feed-through connections, looped or otherwise make circuit connections via wire connectors and pigtails.
- R. Provide a layer of electrical tape around perimeter sides of each wiring device so that terminations are insulated.
- S. Where GFI protected receptacles are indicated on Drawings, each receptacle indicated shall be a GFI receptacle. Standard receptacles protected with an upstream GFI receptacle shall not be approved.
- T. Provide arc-fault circuit interrupter (AFCI) for Branch Circuits feeding receptacles in dwelling unit bedrooms. AFCI protection may be provided by an AFCI receptacle or AFCI device in circuit breaker panel feeding dwelling unit bedrooms.

U. Multiple or Special Switch Stations:

1. Grouped local switches under common cover plate as scheduled or noted on the drawings. Provide pilot lights on all circuits remote from general area or exterior to building. Eight-gang plate maximum - where two plates are required, same shall be equal in size and located one above the other. Switch plates shall include an engraved, Bakelite nameplate to identify function of each switch. Nameplate shall be screwed in place.

3.5 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 33 – Raceway and Boxes to obtain mounting heights as indicated on Drawings.

3.6 FIELD QUALITY CONTROL

- A. Division 01 – General Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect each wiring device for defects.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Verify each receptacle device is energized.
- E. Test each receptacle device for proper polarity.
- F. Test each GFCI receptacle device for proper operation.
- G. If a device fails to properly operate, replace at no extra charge to Owner.

3.7 ADJUSTING

- A. Devices and face plates on a common wall with common mounting heights shall be level and square to each other. Adjustments required after installation shall be made without additional compensation.
- B. Mark conductors with panel and circuit number serving device, at device.
- C. Mark panel and circuit number serving device on backside of device plate with a permanent marking system that does not show through front of plate.

3.8 CLEANING

- A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 26 56 00

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior Luminaries.
2. Accessories.

B. Related Sections

1. Applicable provisions of Division 01 – General Requirements shall govern all work under this Section.
2. Section 26 00 00 – Basic Electrical Requirements.

1.2 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI C82.4 - Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

1.3 SUBMITTALS

A. Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements: Procedures for submittals.

B. Shop Drawings: Indicate dimensions and components for each luminaire not standard Product of manufacturer.

C. Product Data: Submit dimensions, ratings, and performance data.

1. Luminaire specification sheet.
2. Driver specification sheet.
3. Surge protection specification sheet.
4. IES LM-79 test report (include photometry and colorimetry). The photometry should be based on an actual working product, not a prototype or computer model.
5. Product warranty information identifying a minimum warranty of 10 years.
6. Light levels anticipated at 30% life in accordance with LM79.

D. Solid-State Light Fixture Product Checklist per City requirements (See appendix).

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years' experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect products under provisions of Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements.

1.6 COORDINATION

- A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.7 MAINTENANCE MATERIALS

- A. Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements: Spare parts and maintenance products.
- B. Furnish two of each lamp installed.

PART 2 - PRODUCTS

2.1 LUMINARIES

- A. Product Description: Complete exterior luminaire assemblies, with features, options, and accessories per Fixture Schedule.
- B. Substitutions: Substitutions are not permitted except where noted on project plans.

2.2 LED LAMPS

- A. Manufacturers:
 1. General Electric Co.
 2. Philips Electronics North America.
 3. Equivalent as acceptable to Engineer

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify foundations are ready to receive fixtures.

3.2 EXISTING WORK

- A. Disconnect and remove abandoned exterior luminaries.
- B. Extend existing exterior luminaire installations using materials and methods compatible with existing installations, or as specified.
- C. Clean and repair existing exterior luminaries to remain or to be reinstalled.

3.3 INSTALLATION

A. Electrical Requirements:

1. Provide all miscellaneous electrical components necessary to provide a complete and operable lighting system meeting local and National Electrical Code (NEC) requirements. All electrical components shall be UL listed for outdoor use.
2. Provide 120V system, Power Factor>90%, Total Harmonic Distortion<20%.
3. The driver shall be available with input voltages ranges from 120-277 volts. Other installations may need to be available with dimming. Indicate if the fixture is compatible to be able to reduce light output by 50% and if there is an additional cost to provide.
4. The driver, as operated in the luminaire, must not exceed the driver manufacturer's maximum case temperature limits for a rated life of at least 60,000 hours.
5. The luminaire shall be protected against surges according to IEEE C62.42 C High (10kA and kV).
6. The driver electronics shall be encapsulated and sealed to IP 65 rating. Drivers shall be easily accessible and removable without tools.

B. Luminaries

1. Furnish and install luminaries and all necessary miscellaneous accessories and hardware to complete the installation of the luminaries.
2. Follow manufacturer's instructions regarding luminaire installation.
3. Three single-conductor No. 12 (min.) stranded wired shall be used to connect the luminaries to their respective brand conductors at the fixture (or in the pole base). Conductor size shall account for max. 3% voltage drop.
4. All exposed threaded equipment mounting hardware shall be stainless steel. All threaded stainless steel hardware and dissimilar metal, threaded hardware shall be coated with an approved zinc-based anti-seize compound (Loctite or Jet-Lube) by the Contractor.

C. Install concrete bases for lighting poles where required, at locations as indicated on Drawings, in accordance with Division 03.

D. Install poles plumb. Install shims and/or double nuts as required to adjust plumb. Grout around each base.

E. Install lamps in each luminaire.

F. Clean and relamp existing fixtures to remain in area of construction at substantial completion of project work.

G. Bond and ground luminaries, metal accessories, and metal poles in accordance with Section 26 05 26 – Grounding and Bonding.

3.4 FIELD QUALITY CONTROL

A. Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements: Field inspecting, testing, adjusting, and balancing.

- B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

3.5 ADJUSTING

- A. Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Aim and adjust luminaries to provide illumination levels and distribution.

3.6 CLEANING

- A. Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements: Final cleaning.
- B. Clean photometric control surfaces as recommended by manufacturer.
- C. Clean finishes and touch up damage.
- D. Clean and relamp existing fixtures in area of construction at substantial completion.

3.7 PROTECTION OF FINISHED WORK

- A. Section 26 00 00 – Basic Electrical Requirements and Division 01 – General Requirements: protecting finished work.
- B. Relamp luminaries having failed lamps at Substantial Completion.

APPENDIX: Solid State Light Fixture Product Checklist

Solid-State Light Fixture Product Checklist

	Description	Reqd	Response
2.1 Product			
A.	Product Manufacturer	X	_____
	Product Model Number	X	_____
B.1 (a)	Making LED street lights for how long?	X	_____
B.1 (b)	How long has this model been produced?	X	_____
B.1 (c)	Warranty (years)	X	_____
B.2 (d)	Mounting Proposed?	X	_____
B.2 (e)	ANSI vibration rating (3G is required if box is checked)	<input type="checkbox"/>	_____
B.2 (f)	Fixture weight (lbs.)	X	_____
B.3 (a)	LED manufacturer and model number	X	_____
B.3 (c)	CCT (*K)	X	_____
B.3 (d)	CRI	X	_____
B.3 (e)	Projected L70 life (hours)	X	_____
B.4 (a)	IES optical distribution type	X	_____
B.4 (b)	BUG Rating	X	B U G
B.4 (c)	Efficacy (Lumens/Watt)	X	_____
B.4 (c)	Drive Current (mA/Pole)	X	_____
B.4 (d)	Optics IP rating	X	_____
B.5 (c)	Available input voltage range (s)	X	_____
B.5 (c)	Dimming availability and additional cost (Dimming required if box is checked)	<input type="checkbox"/>	_____ \$
B.5 (d)	Driver rated life (hours) and max case temp	X	_____
B.5 (e)	Surge protection level	X	_____
B.5 (g)	Photocell Receptacle availability (receptacle is required if box is checked)	<input type="checkbox"/>	Provide Shorting Caps
1.3 Submittals			
G.	Average Luminance (cd/m2)	X	_____
G.	Avg/min and maz/min uniformity	X	_____
G.	Maximum Lv ratio	X	_____
	Power Consumption (System Watts/Pole)	X	_____

END OF SECTION

SECTION 32 84 23

WATER METER ASSEMBLY

PART 1 – GENERAL

1.1 SUMMARY

- A. The work under this item shall consist of furnishing and installing a water meter assembly. Include all sleeving, piping, valves, controller, backflow preventer, quick coupler valves, and other related appurtenances.

1.2 SUBMITTALS

- A. Submit all product data for all water meter assembly components to the city for approval.

1.3 QUALITY ASSURANCE

- A. Provide all warranty and product information to owner.

PART 2 – PRODUCTS

2.1 FITTINGS

- A. PVC – solvent weld, Schedule 80 for PVC pipe.

2.2 WATER METER

- A. Furnished and installed by the City of De Pere.

2.3 VALVES

- A. Main Line Isolation Valves – PVC Ball Valve as manufactured by Dura or equal.

2.4 BACKFLOW PREVENTER

- A. Rain Bird 100 ASVF 1” or approved equal.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Backflow device and point of connections shall be determined on site and placed at owner’s direction. Backflow shall meet local codes and regulations and those of the manufacturer.
- B. Sleeve in all paved areas where needed, backfill with clean crushed aggregate and compact.
- C. Bury the main line to a minimum depth of 36” with thrust blocking where required.

- D. PVC fittings shall be properly cleaned and glued with approved PVC cement and PVE primer.
- E. Poly fittings shall be double clamped with stainless steel clamps.
- F. Quick coupler valves shall be 1" in size and stabilized with a 3/8" rebar 24" long with two stainless steel pipe straps.
- H. All trenches shall be clean and free of foreign objects such as rocks, asphalt, concrete, etc.
- I. Backfill trenches with fill that is free of material that may damage pipe.

3.2 FIELD QUALITY CONTROL

- A. All workmanship shall be guaranteed for a period of two years after substantial completion. All products shall have a two years minimum warranty from the date of substantial completion.

END OF SECTION

SECTION 32 90 00

PLANTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plant Materials.
2. Soil Amendment Materials.
3. Testing of all topsoil to be used for site planting and amending it in accordance with the recommendations of the Soils Analysis.
4. Landscape Accessories.
5. Planting Soil Preparation.
6. Plant Material Schedule.
7. Planting Operations.
8. Tree and Shrub Planting.
9. Ground Cover, Perennials and Ornamental Grasses.
10. Fertilizing.
11. Inspection and Approvals.
12. Maintenance Service.

B. Related Sections:

1. Applicable provisions of Section 00 70 00 - General Requirements shall govern Work under this Section.
2. Section 31 05 10 – Soils and Aggregates for Earthwork.

1.2 REFERENCES

A. American National Standards Institute (ANSI):

1. Z60.1 - American Standard for Sizing, Handling, and Planting Nursery Stock.

B. ASTM International (ASTM):

1. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

C. Turf Producers International (TPI):

1. Guideline Specifications for Sodding.

1.3 DEFINITIONS

A. Topsoil: As specified in Section 31 05 10 – Soils and Aggregates for Earthwork.

B. Plants: Living trees, shrubs, ground cover, grasses, flowers, and bulbs specified in this Section, and described in ANSI Z60.1.

- C. Clump Form Trees and Shrubs: Plants with a minimum of three and a maximum of five main stems.
- D. Multi-Stem Trees and Shrubs: Plants with multiple stems arising from the root crown in the manner of a shrub.
- E. Weeds: Includes Dandelion, Quack Grass, Morning Glory, Mustard, Chickweed, Crabgrass, Canadian Thistle, and otherwise plants not specified for this project.

1.4 QUALITY ASSURANCE

- A. All tree, shrub, seed, sod, and related landscape materials and operations included in this Section shall be awarded as "one contract" to Contractor, who will be responsible for implementation.
- B. Landscape Architect reserves right to review planting materials at growing site.
- C. Inspection:
 - 1. All rejected material shall be immediately removed from the site and replaced with acceptable material at no additional cost to the Owner.
 - 2. Landscape Architect and Owner's Representative are the sole judges of quality of all material and workmanship, reserving the rights of complete acceptance and rejection.
- D. Observation at growing site does not preclude right of rejection at job site. Plants damaged in transit or at job site shall be rejected.
- E. Qualifications of Landscape Contractor:
 - 1. Landscape work is to be provided by a single firm specializing in Landscape work having not less than five (5) years successful experience in Landscape projects of similar scope and location to this proposed project.
 - 2. Provide at least one person, with a minimum of four (4) years similar experience, who shall be present on site at all times during execution of this portion of the work, who shall be thoroughly familiar with the type of materials being installed and the proper methods for their installation, and who shall direct all work performed under this section.
 - 3. Employ only qualified personnel familiar with required work.
- F. A maintenance program is required for this project, for protection of Owner and Contractor whereas adequate time and monies may be scheduled to properly establish hardy, vigorous growth and to provide pleasant visual environment envisioned by design and construction documents. This is more clearly defined later in this Section.
- G. Live plant nursery shall be located within 100 miles of Project and shall specialize in growing and cultivating plants specified in this Section, with minimum five (5) years experience.

1.5 SUBMITTALS

- A. Following items require prior authorization; submit to Landscape Architect for written approval prior to use on project:
1. Samples:
 - a. Provide representative sample quantities of the following:
 - 1) Mulching material.
 2. Required Landscape Submittals:
 - a. Topsoil report from soils test analysis and Contractor's own written summary of recommended schedule of amendments for each type of planting application: plant beds and trees.
 - b. Landscape accessories.
- B. Topsoil Report:
1. Following shall be provided in addition to submittal requirements listed in Section 31 05 10 – Soils and Aggregates for Earthwork.
 2. Contractor shall retain the services of an independent testing firm to conduct sampling, testing and analysis of salvaged and imported soil and amendments as required by this section and elsewhere in the Contract Documents. Materials testing firm shall be subject to approval by the Owner.
 3. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with experience and capability to conduct testing indicated and that specializes in types of tests to be performed.
 4. Soil Analysis: For each unamended soil type, furnish Landscape Architect with soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 - a. Testing methods and written recommendations shall comply with USDA's Handbook No. 60. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Landscape Architect. If sample quantities are not provided, Contractor shall provide a minimum of three (3) representative samples taken from varied locations for each soil to be used or amended for planting purposes.
 - b. Report suitability of tested soil for turf, native seeding and plant growth.
 - c. Report presence of problem salts, minerals, residual chemicals from agricultural practices (atrazine) or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
 5. Based on soil analysis and testing laboratory's results, Contractor shall provide their own written summary of recommendations for proposed soil treatment and soil amendments to be incorporated for each type of planting application. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for macro and micro nutrients, soil particle, and organic matter amendments required to meet soil specifications.
 6. Collection of soil specimens shall be completed in accordance with accepted practices, and shall be subject to approval by the Owner's Representative.

1.6 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide application.
- B. Plant Materials shall be certified by State of Wisconsin Department of Agriculture, as described by ANSI Z60.1, be true to habit, and be free of insects and disease.

1.7 DELIVERY, HANDLING, AND STORAGE

- A. Deliver, handle and store products under provisions of Section 00 70 00 – General Requirements.
- B. Plant materials smaller than those specified in Schedule will not be accepted and shall not be stored at site.
- C. Trees and Shrubs:
 - 1. Provide freshly dug trees and shrubs. Do not prune prior to delivery unless otherwise approved by Landscape Architect.
 - 2. Provide only deciduous shrubs that have been dug while dormant.
 - 3. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches, or destroy natural shape.
 - 4. Provide protective covering during delivery to prevent wind burn damage. Do not drop balled, burlapped, or other stock during delivery.
 - 5. Keep plants moist at all times, water daily or as needed, and provide adequate drainage.
 - 6. Deliver trees and shrubs after preparations for planting have been completed and plant immediately.
 - 7. If planting is delayed more than six (6) hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.
 - 8. Do not remove container-grown stock from containers until planting time.
 - 9. Do not lift, move, and adjust to plumb, or otherwise manipulate plants by trunks or stems.
- D. Shrubs:
 - 1. Provide shrubs that have been dug while dormant.
- E. Begin plant installation immediately upon delivery. Complete planting within 32 hours after delivery.
- F. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.8 JOB CONDITIONS

- A. Planting – General:
 - 1. Layout:
 - a. Prior to the excavation of planting areas or plant pits, or placing trees stakes, the Contractor shall ascertain the location of all utility lines, electric cables, sprinkling system, and conduits so that proper precautions may be taken not to disturb or damage any subsurface improvements.

- b. Trees shall **not** be planted within five (5) feet of the center line of water lines, storm and sanitary sewer lines and within three (3) feet of the centerline of gas, underground electric or telecommunication lines unless authorized by the Owner's Representative.
- c. Should obstruction be found, the Contractor shall promptly notify the Owner's Representative who will arrange to relocate the plant material. Necessary adjustments shall be approved by the Landscape Architect.

2. Pruning:

- a. Contractor shall do no pruning to undamaged, live portions of the existing or proposed plant material without the specific written approval of the Landscape Architect or City Forester. Proposed plants pruned without approval may be subject to rejection by the Landscape Architect. Unauthorized pruning of the existing trees to remain will be subject to a penalty fee in total as determined by City Administrator.

B. Planting Restrictions:

1. Soil Condition: Neither planting nor other site work shall be carried out in saturated or muddy ground conditions or under other climatic conditions which will inhibit proper execution. No planting shall occur until an acceptable time has expended beyond all application of herbicides or other vegetative controls.
2. Avoid any damage to existing trees or their associated root zones when installing new plant material.

C. Protection:

1. Do not move equipment over existing or newly placed structures without approval of Owner's Representative.
2. Provide board-roading as required to protect paving.
3. Protect other improvements from damage, with protection boards, ramps and protective sheeting.
4. Protection of Plant Material:
 - a. Contractor shall maintain all plant material in a healthy growing condition prior to and during planting operation.
 - b. Contractor shall be responsible for vandalism, theft or damage to plant materials until completion of the maintenance period.
 - c. Provide barricades, snow fencing, hire watchmen or whatever means are deemed necessary to totally protect all plantings.

D. Utilities:

1. Determine locations of all underground utilities and perform work in a manner that will avoid possible damage. Hand Excavate, if required, to minimize possibility of damage to underground utilities.
2. Should obstructions or conflicts with utilities be found, the Contractor shall submit written notification to Owner's Representative of all discrepancies in the drawings, or existing conditions which may interfere with work in this section.

1.9 CLEANUP

- A. Organize delivery, handling, and storage of materials and equipment to facilitate ease of construction sequencing and daily cleanup.

- B. During landscape work, keep pavements clean and open to traffic, construction vehicles, and persons employed by project. Moisten or stabilize topsoil to prevent water and wind erosion.
- C. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers.
- D. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.
- E. Contractor shall ensure uninterrupted normal business operations at site during planting operations, and maintain a clean, orderly, and safe work area during every stage of construction.
- F. At end of each day, properly remove spoil of materials and packaging generated by operations of this contractor from site.

1.10 WARRANTY

- A. Warrant trees, shrubs, plants, turf and all other installations for a minimum period of one year after date identified on certificate of substantial completion, against defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Landscape Contractor's control.
- B. Warranty shall include one entire continuous growing season. Temperature fluctuations in the weather, natural hazards, or other climatic conditions are not considered unusual phenomena and will not waive the Contractor's warranty requirements.
- C. Remove and replace trees, shrubs or other plants found to be dead or in unhealthy condition during warranty period.
- D. Make final replacements during growth season following end of warranty period.
- E. Replace trees and shrubs which are in doubtful condition at end of warranty period; unless, in opinion of Owner's Representative, it is advisable to extend warranty period for a full growing season.
- F. Another warranty inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection.
- G. During warranty period, ensure trees, shrubs, and ground cover remain in a healthy, vigorous condition and renew, treat, or replace any unsightly plants in a timely manner.
- H. At end of warranty period, Owner and Contractor shall make a joint inspection. Renew, treat, or replace plants and lawn areas not in healthy growing condition.
- I. Replacement of nursery grown plants shall be of original size and species as specified and shall be replaced within initial growing season, with a new one year warranty commencing on date of replacement.

- J. All replacement stock is subject to same warranty requirements as original stock. Repair any damage to adjacent site features due to replacement operations.

PART 2 - PRODUCTS

2.1 PLANT MATERIALS

- A. Provide trees, shrubs, and plants of size, species, and quantity shown and scheduled for Landscape Work, nursery-grown under similar climatic conditions, and complying with recommendations and requirements of ANSI Z60.1, American Standard for Nursery Stock. Bare root stock is not acceptable.
- B. All plants shall be of specimen quality; wide, full, and dense. Plants that are not of specimen quality will be rejected by Landscape Architect.
- C. Deciduous Trees: Provide balled and burlapped trees of height and caliper scheduled and as shown and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single-stem, well-developed trees for this project.
- D. Deciduous Shrubs: Provide balled and burlapped shrubs of height shown or listed. Container-grown deciduous shrubs will be acceptable in lieu of balled and burlapped deciduous shrubs, subject to specified limitations for container-grown stock. Containerized stock shall be free of circling roots due to being in container for too long.
- E. Coniferous Trees and Shrubs: Provide balled and burlapped (B&B) of sizes shown or listed. Dimensions indicate minimum spread crown or height as true to growth habit of plant. Container-grown coniferous shrubs will be acceptable in lieu of balled and burlapped shrubs, subject to specified limitations for container-grown stock. Containerized stock shall be free of circling roots due to being in container for too long.
- F. Undersized, diseased, root bound, or otherwise damaged plants are not acceptable, and shall immediately be returned to grower by Contractor.
- G. Ground Cover, Perennials, and Ornamental Grasses: Provide container-grown plants of sizes shown or listed. Plants specific for delivery in one gallon pots shall have been vernalized in an unheated environment through a full winter season within a distance of 100 miles from project.

2.2 SOIL AMENDMENT MATERIALS

- A. Provide the following chemical or organic amendments to topsoil at site, if recommended, and in the proportions as stated in the "Soils Test Analysis Report" and as directed by the Owner's Representative.
 - 1. Organic Soil Amendments - Organic soil amendments shall be capable of passing the 1-inch sieve. The material shall be free of rocks, gravel, wood, debris, and of noxious weeds and their seeds:
 - a. Peat Moss: Shredded, loose, Type 1 sphagnum moss free of lumps, roots, weeds, seeds, inorganic or acidic materials, with a minimum of 85 percent organic material measured by weight.

- b. Humus: Decomposed animal and plant matter, rich in nutrients with no identifiable fibers and within pH range suitable for intended use.
- c. Composted Pine Bark Fines: Potting grade with no particles larger than 1/2-inch, less than 10 percent wood fiber.
- d. Organic compost: Well-aged organic compost of sheep or cow manure.
2. Lime: Natural dolomitic limestone containing not less than 85 percent of total carbonates with a minimum of 30 percent magnesium carbonates, ground so that not less than 90 percent passes a 10-mesh sieve and not less than 50 percent passes a 100-mesh sieve.
3. Aluminum Sulfate: Commercial grade.
4. Bone Meal: Commercial, raw, finely ground; four (4) percent nitrogen and 20 percent phosphoric acid.
5. Fertilizer: 50 percent of elements derived from organic sources, of proportion necessary to eliminate inherent deficiencies of topsoil being not less than 10 percent total nitrogen, 10 percent available phosphoric acid, and five (5) percent soluble potassium.
6. Herbicide: Pre-emergence type herbicide applied per manufacturer's specifications.
7. Pesticide: Commercial grade, used at minimum concentrations as recommended by manufacturer and administered only by experienced technical personnel familiar with safe use and handling.
8. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants. Contractor shall supply and pay for water.

B. Fertilizer for Bulbs: Two (2) tablespoons of bulb food or bone meal per bulb.

2.3 LANDSCAPE ACCESSORIES

- A. Mulching material shall be natural shredded hardwood bark mulch, free of debris, twigs, leaves, and growth or germination inhibiting ingredients, no larger than four (4) inches in any dimension, and suitable for top dressing of planting saucers and beds. Bark mulch shall not contain any wood, and no artificial coloration shall be added.
- B. Stakes and Guys, if Required by Contractor: One (1) tree staking kit for each tree; including three (3) earth anchors, three (3) rust-proof, heavy-duty tension buckles and UV-coated, flexible tree tie webbing as manufactured by Arborbrace, (561) 628-3591, or approved equal.
- C. Anti-Desiccant: Emulsion type, film-forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that a fully prepared subsoil base is ready to receive topsoil and other work of this Section.
- B. Verify that required underground utilities are available, in proper location, and ready for use.
- C. Saturate soil with water to test drainage.

- D. Report conditions detrimental to plant growth or implementation to Construction Manager and Owner's Representative prior to planting.
- E. Beginning of installation means acceptance of existing site conditions.

3.2 PROTECTION

- A. Prior to start of any work of this Section, make contact with buried and overhead utility locating services or agencies to determine depth, location, clearances, and other precautions to avoid damage to existing facilities, equipment, and those employed at site.
- B. Prior to start of any work, Contractor shall coordinate with Owner's Representative and City Forester regarding the existing trees to remain to confirm the proposed demolition and construction improvements will be sufficient enough to ensure 100 percent survival. Owner's Representative and City Forester shall provide final direction for any changes to the proposed demolition and construction improvements deemed necessary for best chance of existing tree survival.
- C. Slight modifications to plant locations may be necessary in order to avoid damage to tree roots and will require prior approval by Owner's Representative or Landscape Architect. Hand excavate as required.
- D. Maintain grade stakes set by others.
- E. Secure, encircle, or otherwise protect Work from intrusion by trespassers, equipment, or others employed at site.

3.3 SUBGRADE SOIL PREPARATION

- A. Remove or mow all vegetation to a height 3 inches.
- B. Remove all rocks, debris, and litter that will prevent compliance with topsoil and seeding specifications.
- C. Final grade area to within two (2) inches of subgrade elevations.
- D. Till or disc the subsoil to a depth of two (2) inches to four (4) inches to allow aeration. Do not till or disc at areas where existing trees are to remain.

3.4 PLANTING SOIL PREPARATION

- A. Preparation of Planting Soil:
 - 1. Before mixing, clean topsoil of roots, plants, sod, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.
 - 2. Mix soil amendments with topsoil at rates specified in soils test analysis report. Delay mixing of fertilizer if planting will not follow placing of planting soil within 48 hours.

3. Mix soil amendments (if required) and fertilizer by suitable means to assure complete mixing and uniform texture using proportions for each use as recommended by soils test analysis report. Do not disturb soils within root zones around existing trees to remain. Coordinate with Owner's Representative and City Forester on any issues or questions about plant bed preparation within the tree root zones.
4. Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before applying planting soil and tilling.

B. Preparation of Planting Beds for Shrubs, Perennials, and Ornamental Grasses:

1. Verify existing planting areas are to scheduled depth and adjust as necessary. Amend as directed in soils test analysis.
2. Install fully-amended topsoil to scheduled depth. Install in 8-inch maximum lifts to the depths and grades shown on the Drawings.
3. Remove stones over 1 inch in any dimension. Remove sticks, rubbish, and other extraneous matter.
4. Evenly spread 2 inches of organic compost over entire plant bed area. Apply other soil amendments as specified in soils test analysis. Apply fertilizer at rate recommended by manufacturer.
5. Thoroughly blend organic compost and fertilizer into top 8 inches of topsoil using rototiller or similar equipment. Do not rototill within existing tree root zones, carefully hand-blend as much as possible and avoid any damage to tree or roots. Allow finished grades to remain 2 inches or higher than final grades shown on the Drawings to anticipate settlement over the first year. At end of warranty period, adjust the grades in plant beds, if required, to the final grades shown on the Drawings.
6. Space plants as indicated on the Drawings.

3.5 PLANT MATERIAL SCHEDULE

- A. Plant Material Schedule is a detailed plant listing indicating static design usage, common and scientific names, minimum size and symbols, and shall be used in conjunction with landscape construction details.
- B. Provide trees, shrubs, and plants of size and species shown and scheduled for landscape work, nursery-grown under similar climatic conditions, and complying with definitions, requirements, and sizing of ANSI Z60.1.
- C. All quantities listed are assembled for convenience of landscape bidding. Successful contractor shall develop lawn areas and install plant material shown on Drawings. Any discrepancies between quantities of plants listed and the quantities shown on the Drawings, the Drawing shall govern.
- D. Sizes of planting stock listed is minimum acceptable size for each plant introduced to site. Additionally, when excessive pruning reduces height, replace plant.
- E. Substitutions: No plant or landscape material substitutions shall be accepted without written permission of the Landscape Architect. This applies to the genus, species, and variety of all plants and miscellaneous landscape items.

- F. All plants shall be true to name and in all cases, botanical names shall take precedence over common names. All plants of each clone, species, or cultivar shall be delivered to the site labeled with their full botanical name.
- G. The Contractor shall review the Drawings and Specifications to coordinate the work indicated in this section with all other related work. In case of any discrepancy, Contractor shall notify Owner's Representative. However, the Planting Specifications take precedence over the Planting Drawings.

3.6 FIELD QUALITY CONTROL

- A. Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.
- B. Substitutions of plant material will not be permitted beyond seven days after conclusion of pre-installation meeting.

3.7 PLANTING OPERATIONS

- A. Prior to beginning of Work specified in this Section, verify that site grading and preparation have been properly completed where necessary for this work.
- B. Proceed with complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.
- C. Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Owner's Representative or City Forester. Coordinate with tree grate and electrical improvements as necessary.
- D. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.
- E. Contractor shall include cost per square yard for additional seed and sod operations required to re-establish adjacent lawn areas which may become damaged during construction process or to repair damage done by others.
- F. Recommended Schedule of Implementation:
 - 1. Live Landscape Plant Materials
 - a. Spring: Mid-April through June
 - b. Fall: Mid-August through late October
- G. Make every effort to install plant materials during normal planting season for each type of landscape work required.
- H. If for any reason installation cannot be completed during these times, take extra care to insure healthy growth of plant material.

- I. Correlate planting with specified maintenance periods to provide maintenance from date of completion.
- J. Work specified in this Section will be postponed until next planting season if other work under this Contract is completed too late in year for planting work to be performed properly.

3.8 TREE AND SHRUB PLANTING

- A. Excavate pits with angled sides.
- B. Scarify side walls to alleviate glazing.
- C. Excavate pit at least three (3) times wider than ball diameter and equal to ball depth. (Note: trees and shrubs planted with crown/root flare of plant lower than adjacent grade will be rejected.) Avoid any damage to tree roots within areas where existing trees are to remain. Refer to Article 3.2 Protection for more information.
- D. For container-grown stock, excavate as specified for balled and burlapped stock, adjusted to two (2) times container width.
- E. Where rubble fill is encountered, notify Owner's Representative and prepare planting pits properly by removal of rubble or other acceptable methods. When conditions encountered are severe and extensive, as determined by Owner's Representative, proceed with additional work at the direction of the Owner's Representative.
- F. Drainage: If subsoil conditions indicate the retention of water in planting areas, as shown by seepage or other evidence indicating presence of underground water, notify the Owner's Representative before backfilling.
- G. For trees and shrubs to be planted in individual holes in areas of good soil that is to remain in place, save the existing soil to be used as backfill.
- H. Backfill excavations for trees and shrubs and allow to percolate before planting. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill. No settling of root balls will be allowed.
- I. Select best viewing angle and set balled and burlapped stock, plumb, and in center of pit or trench with crown/root flare at or slightly above elevation of adjacent finished grades.
- J. Remove burlap and wire basket from top one-half of ball. When set, place additional backfill and eliminate voids and air pockets.
- K. Encircle planting pit with three (3) inch high earth saucer to allow for mulching and watering during establishment. All trees to have minimum six (6) foot diameter mulch ring.

- L. Mulch tree and shrub planting areas with not less than three (3) inch thickness of mulch, and finish level with adjacent lawn grades as directed in field. Keep mulch minimum six (6) inches away from all stems and tree trunk root flares.
- M. If deciduous trees or shrubs are moved in full leaf, spray with anti-desiccant at nursery before moving, and again two weeks after planting.
- N. Prune only dead or damaged branches in accordance with standard horticultural practice, unless otherwise directed by City Forester and Landscape Architect. Do not cut tree leaders.
- O. Stake and guy trees immediately after planting, if required. Contractor shall be responsible for determining if a tree requires staking or guying. Adverse site conditions such as windy sites, slopes greater than 3:1, shallow or unstable soils, bare root plantings or large specimen plantings may require staking or guying.
- P. Trees to remain staked for one additional full growing season. Contractor shall remove stakes and accessories as a part of this project.

3.9 GROUND COVER, PERENNIAL, AND ORNAMENTAL GRASS PLANTING

- A. Install Planting Soil Mixture across ground cover, perennial, and ornamental grass planting bed areas at depth and proportions as recommended in this section. Planting beds may also include shrubs.
- B. Excavate pits with vertical sides and with bottom of excavation set to depth of containers. Loosen hard subsoil in bottom of excavation to insure porosity. Avoid any damage to tree roots within areas where existing trees are to remain. Refer to Article 3.2 Protection for more information.
- C. Dispose of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.
- D. Fill excavations with amended planting soil and allow to percolate before planting.
- E. Set container stock at required spacing, plumb, and in pit or trench with root collar at same elevation as adjacent finished grades. Remove container prior to planting.
- F. When container stock is set, place remaining backfill. Water thoroughly to eliminate voids and air pockets and water again after placing shredded wood mulch.
- G. Top-dress planting areas with not less than three (3) inch and no more than five (5) inch thickness of shredded bark mulch. Keep mulch minimum two (2) inches away from all herbaceous shoots and stems.
- H. Irrigate ground cover and perennial bed weekly for 60 days following installation.

3.10 FERTILIZING

- A. In order to fully satisfy requirements of tree, shrub, seed, and sod planting operations, provide fertilizer of neutral character, with some elements derived from organic sources and containing a percentage of nitrogen, phosphorous, and potassium in a form that will be available to plants during initial period of growth.
- B. Apply fertilizer immediately after time of planting and other application just prior to end of 60-day maintenance period.
- C. Prepare and execute fertilizer operations per manufacturer's recommendations and at rates and varieties specified earlier within this Section.
- D. Lightly water to aid dissipation of fertilizer.

3.11 INSPECTION AND APPROVALS

- A. Design scope, character, color composition, detailing, texture, dynamism, and Contract Documents have been created to satisfy specific site requirements of Owner and governmental agencies. Any modification not set forth and approved at time of pre-installation meeting must be denied.
- B. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until Work is re-inspected and found to be acceptable.
- C. Contractor shall remove plant identification tags after final inspection and approvals.
- D. Final acceptance shall include fertilization and maintenance required to establish vigorous, healthy plantscape as set forth by standard landscape practices and contract documents.

3.12 MAINTENANCE SERVICE

- A. Contractor shall perform maintenance services during construction and up until date of substantial completion, or as otherwise directed by Owner's Representative.
- B. Maintain plant life immediately after planting to establish vigorous growing conditions.
- C. During "maintenance period" provide an ongoing, pleasant visual environment where any plant which is not responding to transplanting is immediately replaced, lawns are repaired, and weeds are constantly removed without exception.
- D. Maintain trees, shrubs and other plants by pruning, cultivating, weeding, and watering, as required for healthy growth for the full maintenance period and during the period before final acceptance of the full project. Restore planting saucers. Maintain moisture depth to ensure vigorous growth.
- E. Tighten and repair stake and guy supports, if used, and reset trees and shrubs to proper grades or vertical position as required.

- F. Installer shall inspect work at 30 days and 60 days following the end of the maintenance period and notify Owner in writing (copy to Owner's Representative) of any deficiencies in irrigation or other maintenance procedures.
- G. Maintenance to also include:
1. Irrigate as necessary to supplement seasonal rainfall.
 2. Trimming and pruning, including removal of clippings and dead or broken branches.
 3. Maintaining guys, turnbuckles and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.
 4. Cultivation and weeding of planting beds.
 5. Application of herbicides for weed control in accordance with manufacturer's instructions. Remedy all damage resulting from use of herbicides.
 6. Application of pesticides in accordance with manufacturer's instructions. Remedy damage resulting from use of pesticides.
 7. Application of fertilizer as specified.
 8. Disease control.
 9. Provide winter plant protection.

END OF SECTION

SECTION 32 91 13.19

PLANTING MIXTURE

PART 1 – GENERAL

1.1 SUMMARY

- A. This section describes furnishing and installing Planting Mixture at the locations shown on the plans and in accordance to the requirements of State Specification 632, the plans, and as hereinafter provided.

1.2 REFERENCES

- A. Wisconsin Department of Transportation (WisDOT), State of Wisconsin Standard Specifications for Highway Construction, Latest Edition (State Specifications)

1.3 SUBMITTALS

- A. Provide a list of all materials used in planting Mixture including manufacturers and quantities and shall ensure that all materials meet the standards.

PART 2 – PRODUCTS

2.1 PLANTING MIXTURE

- A. The Planting Mixture consists of the following blend by volume:
 1. 2 parts topsoil. Topsoil shall conform to State Specification 625.
 2. 1 part sand. Obtain the engineer's approval for the sand.
 3. 1 part compost. Compost shall be either well-rotted shredded leaf mulch, free of disease; or well-rotted, unleached, stable or cattle manure containing no more than 25 percent by volume of straw, sawdust, or other bedding materials and free of toxic substances. Either shall be free of stones, sticks, soil, weed seeds, debris, and other material harmful to plant growth.
 4. 1 part peat moss. Peat moss shall conform to State Specification 632.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Planting Mixture shall be delivered to project site and installed no more than seven days before the start of planting operations for areas receiving Planting Mixture.

3.2 INSTALLATION

- A. Ensure proper excavation of planting area for all areas to receive Planting Mixture. Prepare areas by removing any construction materials, stone, or other debris larger than 2" in length or diameter for all areas.

- B. Provide Planting Mixture for the central islands of roundabouts and for specialized perennial beds as indicated in the plans.

- C. Provide Planting Mixture over entire planting bed area and fine grade to match grades as indicated on plans or to adjacent back of curb or other hardscape surface as indicated on plans and account for settling. Place Planting Mixture in 6-inch to 8-inch lifts, watering or tamping to reduce settling potential. A minimum of 24" depth shall be provided in central islands of roundabouts and for specialized perennial beds as indicated in the plans.

END OF SECTION

SECTION 32 93 13.1

SHREDDED HARDWOOD BARK MULCH

PART 1 – GENERAL

1.1 SUMMARY

- A. Section describes furnishing and installing Shredded Hardwood Bark Mulch at the locations shown on the plans and in accordance to the requirements of State Specifications 632.2.6

1.2 REFERENCES

- B. A Wisconsin Department of Transportation (WisDOT), State of Wisconsin Standard Specifications for Highway Construction, Latest Edition (State Specifications)

1.3 SUBMITTALS

- A. Provide sample to Engineer for approval.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Provide Shredded Hardwood Bark Mulch, as shown on plan and in accordance to State Specification 632.2.6.
- B. Shredded Hardwood Bark Mulch shall be finely shredded and shall be the product of a mechanical chipper, hammermill, or tub grinder.
 - 1. Shall be fibrous and uniformly dark brown in color, free of large wood chunks, and shall be substantially free of mold, dirt, sawdust, and foreign material.
 - 2. Shall not be in an advanced state of decomposition.
 - 3. Shall not contain chipped up manufactured boards, or chemically treated wood, including but not limited to wafer board, particle board, and chromated copper arsenate (CCA) or penta-treated wood.
 - 4. Shall contain no bark of the Black Walnut tree.
 - 5. When air dried, shall all pass a 4-inch screen and no more than 20% by mass of the material shall pass a 0.10-inch sieve.
 - 6. Unattached bark or greenleaf composition, either singly or combined, shall not exceed 20 percent each by mass.
 - 7. The maximum length of individual pieces shall not exceed 4 inches.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Place the Shredded Hardwood Bark Much in such a manner as to not damage plants already in place.

- B. Install Shredded Hardwood Bark Mulch in accordance to State Specification 632.3.9 to a depth of 3 inches over entire area of bed.

END OF SECTION

SECTION 33 00 02.1

FUSIBLE POLYVINYL CHLORIDE (PVC) PIPE

1.1 SUMMARY

- A. Section Includes:
 - 1. PVC pipe for water main
- B. The products described are not installed under this Section.
- C. This specification section is a supplemental to the City of De Pere 2012 Standard Specifications and Section 33 00 02 Polyvinyl Pipe (PVC) Pipe and Fittings.
- D. This material specification covers the requirements of fusible polyvinylchloride pipe, including Fusible C-900 and Fusible C-905.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride)(CPVC) Compounds
 - 2. D1785 Specifications for Poly (Vinyl Chloride) (PVC) Plastic Pipe Schedules 40, 80, and 120
 - 3. D2152 Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride)(PVC) Pipe and Molded Fittings by Acetone Immersion.
 - 4. D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
- B. American Water Works Association (AWWA)
 - 1. C900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch for water
 - 2. C905 Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch
 - 3. M23 Manual of Supply Practices PVC Pipe-Design and Installation, Second Edition
- C. National Sanitation Foundation (NSF)
 - 1. NSF-14 Plastic Piping System Components and Related Materials
 - 2. NSF-61 Drinking Water Components-Health Effects
- D. PPI
 - 1. TR-2 PVC Range Composition Listing Qualified Ingredients

1.3 SUBMITTALS

A. Submit the following:

1. Certification of production date of all materials.
2. Manufacturer's certification that the materials delivered were manufactured, sampled, tested, and inspected in accordance with these specifications and appropriate referenced standards.
3. Product data sheet.
4. Manufacturer's recommendations for assembly.

1.4 QUALITY ASSURANCE

A. Make pipe available to the Engineer's Representative for inspection.

B. Pipe shall be considered defective and will be rejected when:

1. Pitted or cratered.
2. Flaking.
3. Straightness varies more than 1/2 inch in 10 feet.
4. Any defect which prevents assembly according to manufacturer's recommendations.
5. Not utilized within six months of date of production.
6. Pipe is not properly marked.

C. Material brands and/or pipe classes shall not be mixed.

D. Pipe Marking – pipe and fittings shall be marked as follows:

1. Manufacturer's name, trademark or logo.
2. Nominal size.
3. PVC cell classification.
4. Pipe stiffness designation, dimension ratio, or schedule size and pressure class.
5. ASTM or AWWA specification designation.
6. National Sanitation Foundation approval (pipe for potable water).
7. Production date.

E. MANUFACTURER REQUIREMENTS

1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.

F. FUSION TECHNICIAN REQUIREMENTS

1. Fusion Technician shall be qualified by the pipe supplier to install fusible polyvinylchloride pipe. Qualification shall be current as of the actual date of the fusion performance on the project.

G. SPECIFIED PIPE SUPPLIERS

1. Fusible polyvinylchloride pipe shall be used as manufactured under the trade names Fusible C-900, or Fusible C-905 for Underground Solutions, Inc. or Engineer approved equal.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inspect the pipe shipment to identify shifted loads, broken packaging or rough treatment, which could be an indication of damage.
- B. Unload the pipe in a manner which will not put stress on the pipe or strike anything causing damage.
- C. Place and store the pipe package units on level ground stacked no more than 8 feet high. Do not store close to heat sources.
- D. Store gaskets away from excessive exposure to heat, direct sunlight, ozone, oil or grease.
- E. Store Solvent cement in tightly sealed containers away from excessive heat.
- F. Handle pipe in a manner to prevent impact blows, abrasion damage, gouging or cutting.
- G. 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

2.1 WATER MAIN

- A. Fusible polyvinylchloride pipe for potable water shall conform to AWWA C900, ASSA C905, or ASTM D2241, as applicable. Testing shall be in accordance with the referenced AWWA standards for all pipe types. Pipe shall be marked verifying suitability for potable water service per NSF-61
- B. Fusible polyvinylchloride pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
- C. The pipe shall be manufactured in a standard 40 foot nominal length or custom lengths, unless otherwise approved by the Engineer.
- D. Pipe shall be blue in color for potable water use.

2.2 FUSION JOINTS

- A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints.

2.3 FUSIBLE POLYVINYLCHLORIDE SWEEPS OR BENDS

- A. Sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances and pressure class of the pipe being joined by the sweep or bend.

- B. Sweeps or bends shall be manufactured from the same fusible polyvinyl chloride pipe being used for the installation, and shall have at least two feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation.
- C. Angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4-inch through 16-inch.

PART 3 – EXECUTION

3.1 FUSION PROCESS

- A. Pipe shall be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and the pipe supplier's guidelines.
- B. Pipe shall be fused by a qualified fusion technician.
- C. Pipe supplier's procedures shall be followed at all times during fusion procedures.
- D. Each fusion shall be recorded and logged by an approved electronic monitoring device (data logger) connected to the fusion machine, which utilizes a current version of the pipe suppliers recommended and compatible software.
- E. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process.

3.2 GENERAL INSTALLATION

- A. Installation guidelines from the pipe supplier shall be followed for all installations.
- B. The Pipe shall be installed in a manner so as not to exceed the recommended bending radius guidelines.
- C. Where pipe is installed by pulling in tension, the recommended maximum safe pulling force, established by the pipe supplier, shall not be exceeded.

END OF SECTION

SECTION 33 00 05

DOUBLE AND TRIPLE WALLED POLYPROPYLENE PIPE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Double walled polypropylene pipe for mainline gravity storm sewer.
2. Triple walled polypropylene pipe for mainline gravity storm sewer.

B. The products described are not installed under this Section.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
2. F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
3. F2736 Standard Specification for 6 to 27 in. (152 To 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe And Double Wall Pipe
4. F2764 Standard Specification for 30 to 60 in. [750 to 1500 mm] Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications

1.3 SUBMITTALS

A. Submit the following:

1. Certification of production date of all materials.
2. Manufacturer's certification that the materials delivered were manufactured, sampled, tested, and inspected in accordance with this specifications and appropriate referenced standards.
3. Product data sheet.
4. Manufacturer's recommendations for assembly.

1.4 QUALITY ASSURANCE

A. Make pipe available to the Engineer's Representative for inspection.

B. Pipe shall be considered defective and will be rejected when:

1. Pitted or cratered.
2. Flaking.
3. Straightness varies more than ½ inch in 10 feet.
4. Any defect which prevents assembly according to manufacturer's recommendations.
5. Not utilized within twelve months of date of production.
6. Pipe is not properly marked.

- C. Material brands and/or pipe classes shall not be mixed.
- D. Pipe Marking – pipe and fittings shall be marked as follows:
 - 1. Manufacturer’s name, trademark or logo.
 - 2. Nominal size.
 - 3. Pipe stiffness designation, dimension ration, or schedule size and pressure class.
 - 4. ASTM specification designation.
 - 5. Production date.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inspect the pipe shipment to identify shifted loads, broken packaging or rough treatment, which could be an indication of damage.
- B. Unload the pipe in a manner which will not put stress on the pipe or strike anything causing damage.
- C. Place and store the pipe package units on level ground stacked no more than 8 feet high. Do not store close to heat sources.
- D. For onsite gasket installation on pipe, store gaskets away from excessive exposure to heat, direct sunlight, ozone, oil or grease.
- E. For gaskets installed on the pipe offsite, keep the protective wrap on gaskets until installation.
- F. Handle pipe in a manner to prevent impact blows, abrasion damage, gouging or cutting.
- G. When handling pipe in cold weather, provide additional care to prevent damage due to impact.

PART 2 – PRODUCTS

2.1 NON-PRESSURE RATED PIPE

- A. Mainline Gravity Sewer and Sewer Services
 - 1. Pipe fittings and repair couplings shall be manufactured and tested in accordance with the following standards:
 - a. Sizes 8 inch through 27 inch and depths up to 20 feet: ASTM F2736, PSM SDR-35 PVC
 - b. Sizes 30 inch through 60 inch and depths up to 20 feet: ASTM F2764, PS46 PVC, T-1 minimum cell classification
 - 2. Pipe shall have a minimum pipe stiffness of 46 PSI.
 - 3. Minimum height of cover to the top of pipe to the existing elevation or proposed finished elevation (whichever is less) shall be two feet.
 - 4. Elastomeric Gaskets: Conform with ASTM F477
 - 5. Elastomeric Joints: Conform with ASTM D3212
 - 6. Solvent Weld Joints: Not permitted.

B. Sewer Services

1. 4” and 6” pipe shall be Schedule 40 PVC and conform to section 33 00 02, Polyvinyl Chloride (PVC) Pipe and Fittings.
2. Branch laterals shall be designed to accept SDR 35.

2.2 DEFLECTION TEST REQUIREMENTS

A. Deflection testing procedures shall conform to Section 01 45 23 10, Testing and Inspection of Pipeline and Appurtenances.

B. The following table shall be used for the mandrel setting for Polypropylene Pipe:

Table 1
SaniTite HP Recommended Mandrel Settings

Pipe Type	Pipe Diameter (Inches)	Minimum Inside Diameter (Inches)	Inside Diameter With 5% Deflection (Inches)
Dual Wall	12	11.90	11.31
	15	14.85	14.11
	18	17.93	17.03
	21	20.79	19.75
	24	23.90	22.71
	30	29.79	28.30
Triple Wall	30	29.62	28.14
	36	35.40	33.63
	42	41.31	39.24
	48	47.31	44.94
	60	59.30	56.34

END OF SECTION

EXHIBIT 1
HISTORIC SITE PHOTOS

SITE PHOTOGRAPHS



James Street Reconstruction
De Pere, Wisconsin



Photo #: 1

Direction of View: South

Comment: Lee Building Basement
(during construction)

SITE PHOTOGRAPHS

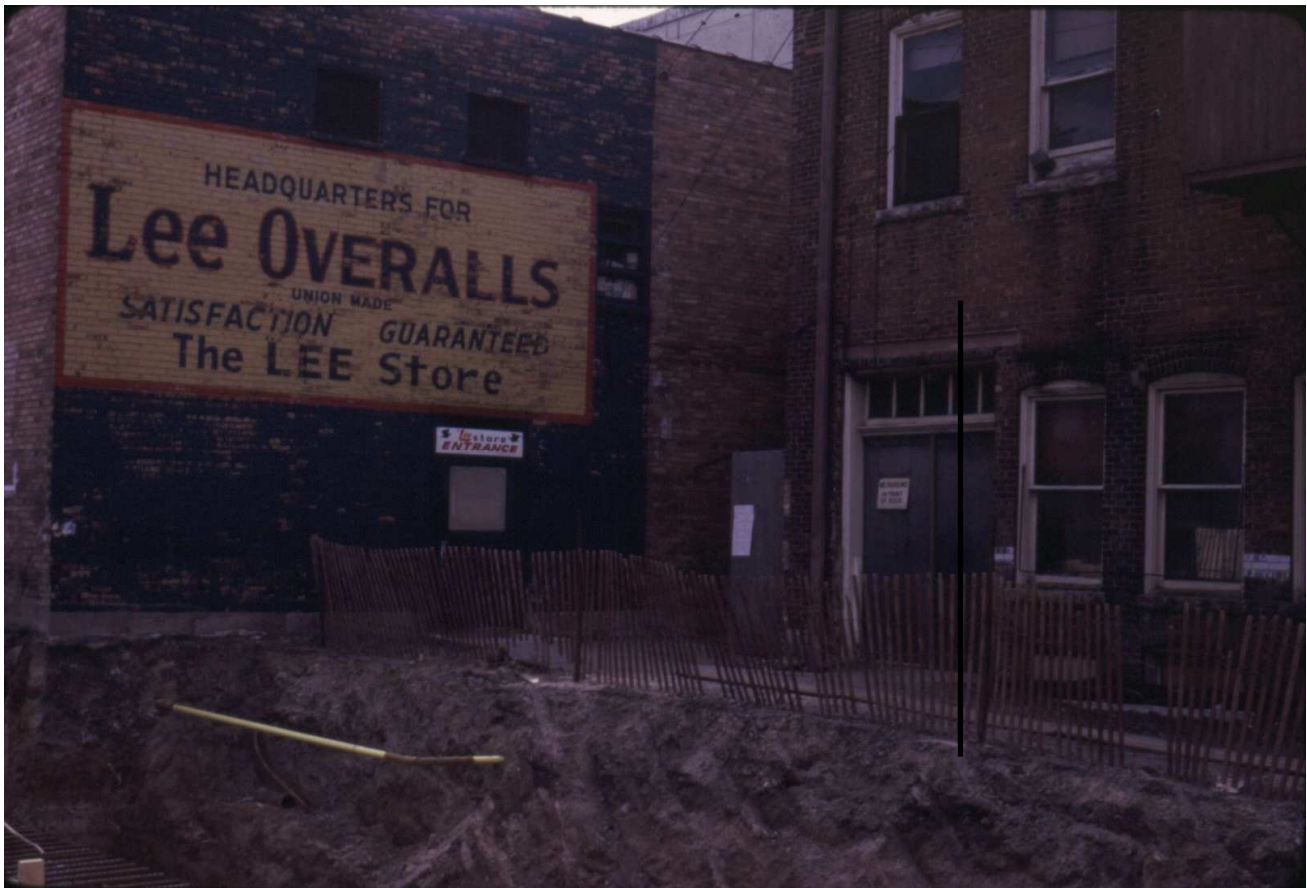


James Street Reconstruction
De Pere, Wisconsin

Photo #: 2

Direction of View: Southwest

Comment: Lee Building Basement
(during construction)



SITE PHOTOGRAPHS



James Street Reconstruction
De Pere, Wisconsin

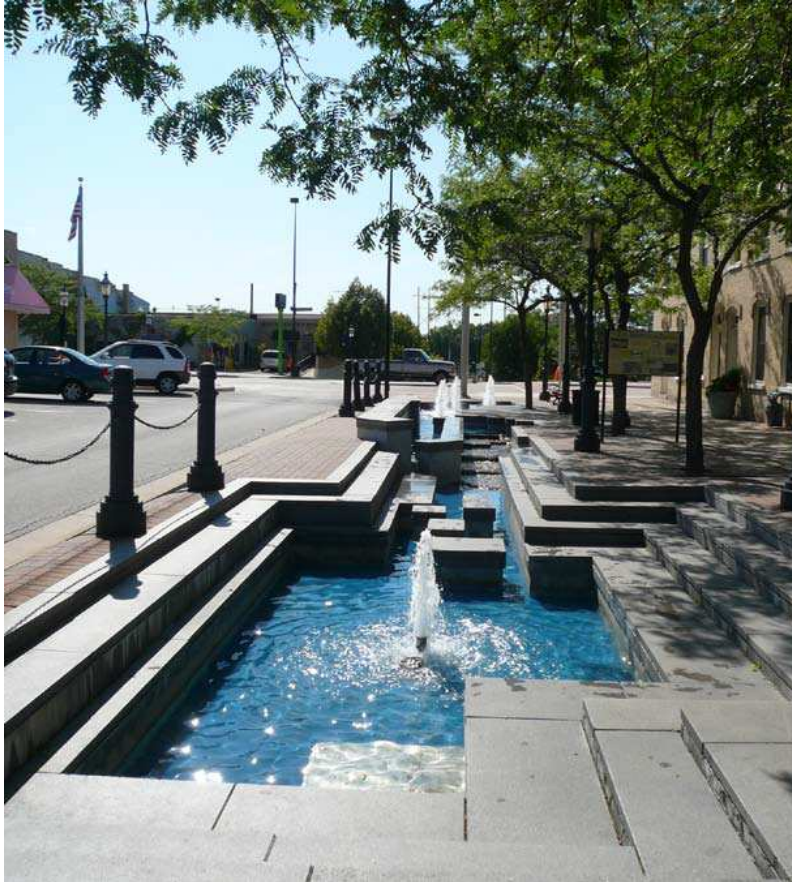


Photo #: 3

Direction of View: West

Comment: Existing Fountain Structure (prior to stone placement)



Photo #: 4

Direction of View: East

Comment: Existing Fountain Structure (prior to stone placement)

APPENDIX A
GEOTECHNICAL ENGINEERING REPORT,
2019 CONSTRUCTION DESIGN FOR JAMES STREET
BY ECS MIDWEST, LLC (12/17/2018)



ECS Midwest, LLC

Geotechnical Engineering Report

2019 Construction Design

Garrity's Glen South

College Avenue

James Street

Prosper Street

Ryan Road

De Pere, Brown County, Wisconsin

ECS Project Number 59:1549

December 17, 2018





December 17, 2018

Mr. Chase Kuffel
City of De Pere
925 South Sixth Street
De Pere, WI 54115
Email: ckuffel@mail.de-pere.org

ECS Project No. 59:1549

Reference: Geotechnical Engineering Report
2019 Construction Design
Garrity's Glen South
College Avenue
James Street
Prosper Street
Ryan Road
De Pere, Brown County, Wisconsin

Mr. Kuffel:

ECS Midwest, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. We performed our services in general accordance with our Proposal No. 59:203, dated February 1, 2018. This report presents our understanding of the geotechnical aspects of the project, the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to the City of De Pere during the design phase of this project. We would appreciate the opportunity to remain involved during the remainder of the design phase, and we would like to provide our services during the construction phase to verify the assumptions of subsurface conditions made for this report. Please contact us should you have any questions concerning the information contained in this report, or if we can be of further assistance to you.

Respectfully submitted,

ECS Midwest, LLC

Mark E. King, P.E.
Group Manager
mking@ecslimited.com



George E. Barker, P.E.
Assistant Office Manager
gbarker@ecslimited.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	2
1.1 General	2
1.2 Scope of Services	2
1.3 Authorization	2
2.0 PROJECT INFORMATION	3
2.1 Project Location	3
2.2 Past Site History/Uses	3
2.3 Current Site Conditions	3
2.4 Proposed Construction	4
3.0 FIELD EXPLORATION	5
3.1 Field Exploration Program	5
3.1.1 Test Borings	5
3.2 Soil Survey Mapping	5
3.4 Subsurface Characterization	8
3.5 Groundwater Observations	9
4.0 LABORATORY TESTING	10
5.0 DESIGN RECOMMENDATIONS	11
5.1 Pavement Design considerations	11
5.2 Infiltration Design Considerations	13
6.0 SITE CONSTRUCTION RECOMMENDATIONS	15
6.1 Subgrade Preparation	15
6.1.1 Existing Utilities	15
6.1.2 Stripping and Initial Site Preparation	15
6.1.3 Special Subgrade Preparations – Utilities	15
6.1.4 Special Subgrade Preparations – Pavements	15
6.1.5 Proofrolling	17
6.1.6 Site Temporary Dewatering	17
6.1.7 Subgrade Stabilization	18
6.2 Earthwork Operations	18
6.2.1 Engineered Fill Materials	18
6.2.2 Compaction	19
6.3 Pavement Subgrade Observations	21
6.4 Utility Installations	21
6.5 General Construction Considerations	21
7.0 CLOSING	24

APPENDICES

Appendix A – Drawings & Reports

- Site Location Diagram
- Boring Location Diagram

Appendix B – Field Operations

- Reference Notes for Boring Logs
- Test Boring Log 1 through 11
- Soil And Site Evaluation - Storm

Appendix C – Supplemental Report Documents

- Important Information about This Geotechnical-Engineering Report

EXECUTIVE SUMMARY

The main findings of the exploration are briefly summarized below. Information gleaned from the executive summary should not be utilized in lieu of reading the entire geotechnical report.

- The geotechnical exploration performed for the planned addition included eleven (11) standard penetration test borings. ECS drilled the borings to a depth of approximately 10 to 23 feet below the existing grade for a total of 173 feet.
- The borings generally encountered an asphalt or concrete pavement section at the surface, but Boring 1 through 4 contained a 6 to 8 inch topsoil layer. The generalized soil profile below the near surface layer consisted of existing FILL, which extended to a depth of between 2 and 5½ feet below the existing grade, and then lacustrine soils extended to the termination depth of the borings. However, Boring 1, 3, 9 and 11 did not contain existing fill strata. The encountered existing FILL consisted of lean clay, silty clay and sandy silty clay with organics. Further, the encountered lacustrine consisted of lean clay, fat clay, silty clay and silt soils.
- The drill crew observed a groundwater level in Boring 7 at a depth of 8 feet below the existing grade during drilling. The drill crew also observed a groundwater level in Boring 4 at a depth of 18 feet below the existing grade at the completion of drilling operations. However, none of the other borings contained a measureable groundwater level.
- The existing FILL exhibited a medium stiff to stiff consistency with SPT N-values ranging from 5 to 10 bpf (blows per foot). The lacustrine soils exhibited a very soft to very stiff consistency with SPT N-values ranging from 2 to 27 bpf and unconfined compressive strengths ranging from 0.25 to 5.5 tsf (tons per square foot).
- ECS recommends the removal of all existing fill and organic soils from below utility structures and pipes.
- ECS anticipates the encountered soils will remain in place below pavements unless the soils contain more than 5 percent organic content or proof-rolling operations indicate rutting or deflections in excess of 1 inch. Consideration should be given to providing Excavation Below Subgrade (EBS) for frost concerns where the exposed subgrade contains highly frost susceptible soil (e.g. silt, silty clay or sandy silty clay).
- In our opinion, initial attempts to control groundwater seepage into excavations could include a series of sump pits and pumps. However, if the groundwater level cannot be controlled with a series of sump pumps, or where excavations extend below the static groundwater level, then dewatering efforts will require a more substantial system (such as temporary well point system).

1.0 INTRODUCTION

1.1 GENERAL

ECS prepared this report for the purpose of providing the results of our subsurface exploration and laboratory testing, site characterization, engineering analysis, and geotechnical recommendations for the design and construction of utility infrastructure and pavements. The report also includes our recommendations concerning geotechnical subgrade preparation, fill placement, dewatering and construction considerations.

1.2 SCOPE OF SERVICES

ECS performed eleven (11) standard penetration test borings at the approximate locations shown on the site plan prepared by the City of De Pere, which was provided with the request for soil borings, dated November 1, 2018. We also implemented a limited laboratory-testing program to characterize the physical and engineering properties of the subsurface soils.

This report discusses our exploration and testing procedures, presents our findings and evaluations, and includes the following.

- A brief description of our field and laboratory test procedures and results.
- A description of the observed surface topographical features and site conditions.
- A description of area and site geologic conditions.
- A description of the interpreted subsurface soil stratigraphy with pertinent available physical properties.
- Copies of our records of subsurface exploration (test boring logs).
- Recommendations for design of pavements (rigid and flexible) including subgrade preparation, soil parameters for WisDOT pavement design and pavement drainage.
- Recommendations for storm water infiltration.
- Utility construction considerations.
- Recommendations for site preparation and construction of engineered fills, including an evaluation of on-site soils for use as compacted fills, and delineation of potentially unsuitable soils.
- Evaluation and recommendations relative to groundwater control.

1.3 AUTHORIZATION

ECS provided services in accordance with our Proposal No. 59:203, (dated February 1, 2018) and the "Agreement for Contractor Services – City of De Pere" authorized by Mr. Michael Walsh, Mayor and Ms. Shana Ledvina, Clerk-Treasurer (dated April 19, 2018), and includes the Terms and Conditions of Service outlined in the Proposal and Agreement.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION

The project sites are located in the City of De Pere, Brown County, Wisconsin. Specifically, the project sites are located at the following locations: proposed Garrity's Glen South subdivision; the portion of College Avenue that extends west of 4th Street; the portion of James Street between North Broadway Street and Wisconsin Street; the portion of Prosper Street between Enterprise Drive and South Broadway Street; and the portion of Ryan Road between South Melcorn Circle and Deer Point Lane. The site location is shown in Figure 2.1.1 and on the Site Location Diagram in Appendix A of this report.



Figure 2.1.1 Site Locations (outlined in red)

2.2 PAST SITE HISTORY/USES

ECS reviewed aerial photographs of the subject site dated 1992, 2005, 2006, 2008, 2010, 2011, 2015, 2017 and 2018. Based on our review of the aerial photographs, the site use at Garrity's Glen South appears to consist of agricultural land since at least 1992. Further, the site use at College Avenue, James Street, Prosper Street and Ryan Road appears to consist of asphalt or concrete paved street sections. These site uses appear to have remained relatively unchanged since at least 1992.

2.3 CURRENT SITE CONDITIONS

The site of the proposed construction consisted of an existing farm operation at Garrity's Glen South, an asphalt paved urban street section at College Avenue and James Street, a concrete paved urban street section at Prosper Street, and an asphalt paved rural roadway at Ryan Road at the time

of drilling. The ground surface generally consisted of nearly level to gently sloping soils across the sites. However, ECS did not determine the surface elevation at the boring locations.

2.4 PROPOSED CONSTRUCTION

ECS understands the proposed project will include new construction and reconstruction of existing municipal utilities and roadway pavements. Further, we anticipate the proposed pavements will consist of a concrete or bituminous pavement section, and the new vertical alignment will approximately match the existing alignment (less than 2 feet). The planned traffic volume was not provided to us at the time of this report. ***If the design changes, please notify ECS immediately so that we evaluate our recommendations and verify the recommendations are appropriate for the proposed construction.***

Where the borings encounter subsurface conditions that might be detrimental to the support of the proposed construction, ECS has assumed the owner will have an acceptable risk level if the detrimental material remains in place. With this in mind, this report assumes the owner would only be willing to accept a low risk for utility settlement in excess of 1 inch. In addition, we assume the owner would be willing to accept a moderate risk for reduced pavement performance. ***If these assumptions concerning the owner's acceptable risk level are incorrect, we should be immediately contacted so we can review our recommendations in light of the changed acceptable risk level.***

3.0 FIELD EXPLORATION

3.1 FIELD EXPLORATION PROGRAM

ECS used the boring depths and locations provided by Mr. Chase Kuffel, Assistant City Engineer of the City of De Pere, to characterize the project site in general geotechnical and geological terms, and to evaluate subsequent field and laboratory data to assist in the determination of geotechnical recommendations.

3.1.1 Test Borings

ECS drilled eleven (11) standard penetration test borings within the limits of the proposed construction. The drill crew advanced four (4) of the borings to a depth of approximately 10 feet, one (1) to 15 feet, one (1) to 17 feet, one (1) to 18 feet, three (3) to 20 feet, and one (1) to 23 feet below the existing grade. We performed the borings with a truck vehicle mounted rotary drill rig utilizing continuous flight hollow stem augers (HSA).

ECS personnel identified the test boring locations in the field using a measuring tape relative to existing site features. The approximate as-drilled test boring locations are shown on the Boring Location Diagram in Appendix A of this report. However, our scope did not include obtaining the surface elevation at the boring locations.

The drill crew conducted standard penetration tests (SPTs) in the boreholes at regular intervals in general accordance with American Society for Testing Materials (ASTM) D1586 (American Association of State Highway and Transportation Officials (AASHTO) T206). The obtained standard penetration resistances provide a general indication of soil relative density and consistency. The drill crew chief visually and manually classified the samples in the field in accordance with ASTM: D2488. Field personnel then collected representative soil samples and returned them to the laboratory for further observation and verification of the field classification.

Some borehole backfill settlement or expansion can and will occur over time. Monitoring the boreholes after the initial drilling activities is not within our scope. Settlement or expansion of the borehole backfill can create a hazard and should be carefully monitored by the client.

3.2 SOIL SURVEY MAPPING

Based on our review of the Soil Survey from the USDA - Natural Resources Conservation Service (websoilsurvey.nrcs.usda.gov), which provides soil information to a shallow depth (generally less than 5 feet), the site soils are generally mapped as Fill land (Fd), Manawa silty clay loam (McA), Oshkosh sandy loam (OmB), Oshkosh silt loam (OnA and OnB), Oshkosh silty clay loam (OsA) and Poygan silty clay loam (Po). These soil types are described with the following properties.

- Fill land (Fd) – Landforms consisting of human transported materials of various soil types. These soils are generally well drained and have a moderate potential for frost action. This soil type is mapped in the area of Boring 7.

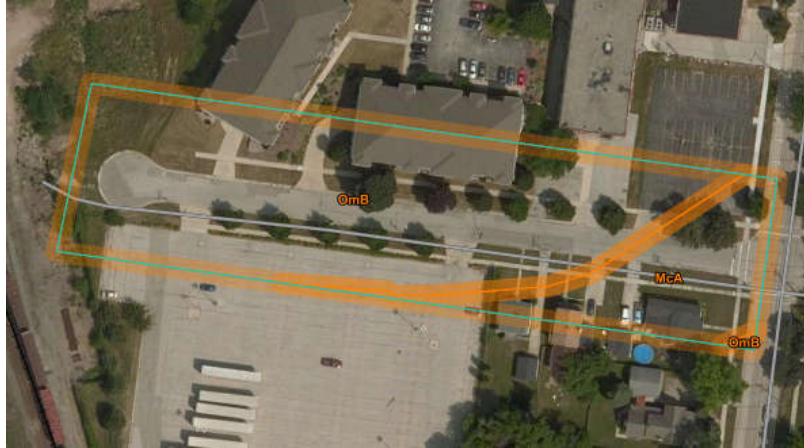
- Manawa silty clay loam (McA) – Landforms consisting of drainageways with clayey till, and/or calcareous, dense clayey till. These soils are generally somewhat poorly drained, classified as being in Hydrologic Soil Group D, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 8.
- Oshkosh sandy loam (OmB) – Landforms consisting of glacial lakes with silty loess over clayey lacustrine deposits. These soils are generally well drained, classified as being in Hydrologic Soil Group C, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 5 and 6.
- Oshkosh silt loam (OnA and OnB) – Landforms consisting of glacial lakes with silty loess over clayey lacustrine deposits. These soils are generally well drained, classified as being in Hydrologic Soil Group C, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 9, 10 and 11.
- Oshkosh silty clay loam (OsA) – Landforms consisting of glacial lakes with silty loess over clayey lacustrine deposits. These soils are generally well drained, classified as being in Hydrologic Soil Group C, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 1, 2 and 4.
- Poygan silty clay loam (Po) – Landforms consisting of depressions with silty and clayey till. These soils are generally poorly drained, classified as being in Hydrologic Soil Group C/D, and have a high potential for frost action. This soil type is mapped in the area of Boring 3.

Soil mapping of the site vicinity is presented in the following figures.



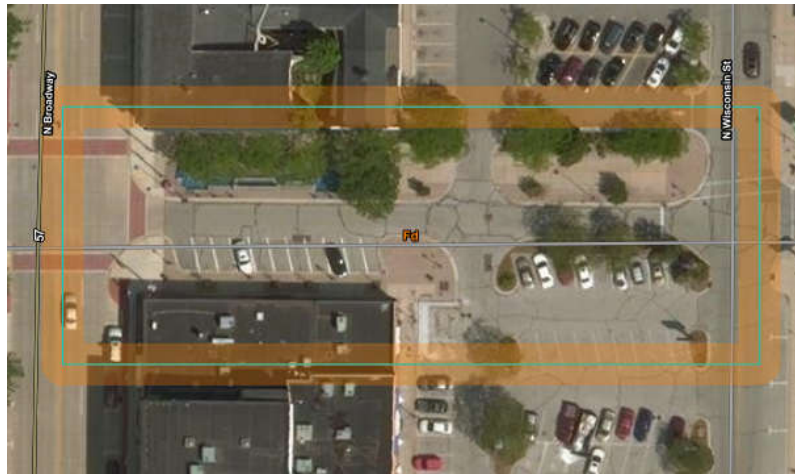
(Source: USDA - Natural Resources Conservation Service)

Figure 3.3.1 Soil Survey Information (Garry's Glen South)



(Source: USDA - Natural Resources Conservation Service)

Figure 3.3.2 Soil Survey Information (College Avenue)



(Source: USDA - Natural Resources Conservation Service)

Figure 3.3.3 Soil Survey Information (James Street)



(Source: USDA - Natural Resources Conservation Service)

Figure 3.3.4 Soil Survey Information (Prosper Street)



(Source: USDA - Natural Resources Conservation Service)
Figure 3.3.5 Soil Survey Information (Ryan Road)

3.4 SUBSURFACE CHARACTERIZATION

The encountered subsurface conditions in the borings closely match published geological mapping. Table 3.4.1 of this report provides generalized characterizations of the soil strata encountered during our subsurface exploration. For subsurface information at a specific test boring location, refer to the boring logs in Appendix B of this report.

Table 3.4.1 Subsurface Stratigraphy

Approximate Depth Range (feet)	Strata	Description	SPT ⁽¹⁾ N-value Range (bpf)	Unconfined Compressive Strength ⁽²⁾ (tsf)
Surface	--	Approximately 6 to 8 inch thick topsoil layer at Boring 1 through 4, and 7 to 23 inch thick asphalt or concrete pavement section at Boring 5 through 11.	N/A	N/A
2 - 5½	I	FILL: lean clay (CL), silty clay (CL-ML) and sandy silty clay (CL-ML) with organics, medium stiff to stiff	5 - 10	N/A
10 - 23	II	Lacustrine: lean clay (CL), fat clay (CH), silty clay (CL-ML) and silt (ML), very soft to very stiff	2 - 27	0.25 - 5.5

Notes: (1) Standard Penetration Test.
 (2) Based on calibrated hand penetrometer test

Because the drill crew used discontinuous material sampling intervals at the test borings, we inferred conditions between sample intervals. The soil stratification shown on the boring logs represents the interpreted soil conditions at the actual boring locations. Variations in the

stratification can occur between sample intervals and boring locations. The subsurface conditions at other times and locations on the site may differ from those found at the boring locations. If different site conditions are encountered during construction, then ECS should be contacted to review our recommendations relative to the new information.

Because of the limitations of the split-spoon sampler, which has a 1 $\frac{3}{8}$ -inch inside diameter, the soil classifications noted on the boring logs may not be representative of the entire soil matrix. Materials larger than the 1 $\frac{3}{8}$ -inch inside diameter of the split-spoon sampler cannot be collected and observed directly. Where possible, the drill crew noted the estimated depth of larger diameter materials, such as cobbles, based on things such as changes in the observed drilling resistance and auger cuttings.

3.5 GROUNDWATER OBSERVATIONS

The drill crew observed a measureable groundwater level in Boring 7 at a depth of 8 feet below the existing grade during drilling and in Boring 4 at a depth of 18 feet at the completion of drilling operations. However, none of the other borings contained a groundwater level.

Variations in the long-term water table elevation may occur as a result of seasonal variations in precipitation, evaporation, surface water runoff, lateral drainage conditions, construction activities, and other factors. The time of year and the weather history during the advancement of the borings should be considered when estimating groundwater levels at other points in time.

4.0 LABORATORY TESTING

The laboratory testing performed by ECS for this project consisted of select tests performed on samples obtained during our field exploration operations. The following paragraphs briefly describe the results of the completed laboratory testing program. We performed classification and index property tests on representative soil samples obtained from the test borings to aid classification of the soils, and to help estimate engineering properties.

A geotechnical engineer visually classified each collected soil sample from the test borings on the basis of texture and plasticity using the Unified Soil Classification System (USCS) and ASTM D2488 (AASHTO T206), Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) as a general guideline. After classification, the geotechnical engineer grouped the various soil types into the major zones noted on the test boring logs in Appendix B of this report. The group symbols for each soil type are indicated in parentheses before the soil descriptions on the test boring logs. The bracketed text noted on the boring logs after the group symbols indicates the AASHTO Classification. The stratification lines designating the interfaces between earth materials on the test boring logs are approximate; in-situ, the transitions may be gradual.

Calibrated hand penetrometer tests (Q_p) were also performed on cohesive soil samples to estimate the soil's unconfined compressive strength. In the hand penetrometer test, the unconfined compressive strength of a soil sample is estimated, to a maximum of 6.0 tons per square foot (tsf), by measuring the resistance of a soil sample to penetration by a small, calibrated, spring-loaded cylinder. Although unconfined compressive strength does not relate directly to pavement design equations, ECS utilizes this information for comparative strength of soil layers. The hand penetrometer test results can be found on the boring logs adjacent to the number of the tested sample included in Appendix B of this report.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposal.

5.0 DESIGN RECOMMENDATIONS

5.1 PAVEMENT DESIGN CONSIDERATIONS

Subgrade Characteristics: The pavement design recommendations assume the subgrade consists of suitable materials evaluated by ECS, and the subgrade is prepared as recommended in the Subgrade Preparation and Earthwork Operations sections of this report.

Based on the results of our soil borings, ECS recommends the use of the pavement subgrade design parameters noted in Table 5.1.1 of this report, which provides values for the first suitable soil strata encountered in the borings. ECS obtained the values for the Soil Support Value and Design Group Index from the WisDOT Pavement Design Manual and Frost Index values from the frost susceptibility classifications according to the U.S. Army Corps of Engineer's criteria. We estimated the Subgrade and Resilient Modulus values based on historical testing of similar soil. For grading work and drainage design, shrinkage should be in the range of 20 to 35 percent for the encountered soils. These values correlate to expansion factors of 25 to 54 percent. For design purposes we recommend using an average shrinkage factor of 25 percent (33 percent expansion factor).

Table 5.1.1 Recommended Pavement Subgrade Design Parameters^{1, 2}

Boring Number	Location ³	Soil Classification		Subgrade Reaction Modulus, K (psi/in)	Resilient Modulus, Mr (psi)	Frost Index	Soil Support Value	Design Group Index
		USCS	AASHTO					
1	Garrity's Glen South	CL	A-6	125	2,800	F-3	4.2	12
2	Garrity's Glen South	CL [FILL] ³	A-6	125	2,800	F-3	4.2	12
3	Garrity's Glen South	CL	A-6	125	2,800	F-3	4.2	12
4	Garrity's Glen South	CL [FILL] ³	A-6	125	2,800	F-3	4.2	12
5	College Avenue	CL-ML [FILL] ³	A-4	125	2,800	F-4	3.9	14
6	College Avenue	CL-ML [FILL] ³	A-4	125	2,800	F-4	3.9	14
7	James Street	CL [FILL] ³	A-6	125	2,800	F-3	4.2	12
8	Prosper Street	CL [FILL] ³	A-6	150	3,000	F-3	4.2	12
9	Prosper Street	CL	A-6	175	3,300	F-3	4.2	12
10	Ryan Road	CL [FILL] ³	A-6	125	2,800	F-3	4.2	12
11	Ryan Road	CL	A-6	150	3,000	F-3	4.2	12

- Notes:
1. All design parameters are estimates only, and are based on historical data for similar soil types. If more accurate values are required, additional testing should be performed.
 2. Design parameters are for the first suitable soil strata below the proposed pavement elevation encountered in the borings. If more than 2 feet of sub-base fill material is placed, the characteristics of the fill will govern the pavement design.
 3. Denotes existing fill which, understanding the risks noted in the Subgrade Preparation section of this report, is suitable to support the proposed pavement section.

Areas of subgrade stabilization and/or undercut may be needed because of the potentially variable support of the existing fill, especially if the subgrade is subjected to construction traffic disturbance or if construction is during adverse weather conditions. A reduced service life, increased pavement maintenance and associated costs should be expected because of the existing fill subgrade. In addition, consideration should be given to providing Excavation Below Subgrade (EBS) for frost concerns in areas where the exposed subgrade contains highly frost susceptible soil (e.g. silt, silty clay or sandy silty clay).

The ends of over-excavated areas should be sloped across a minimum length of 10 feet to reduce the potential abrupt changes in the pavement support characteristics that could lead to future pavement distress. Furthermore, in areas requiring over-excavation for detrimental frost concerns and in trenches for utilities, ECS recommends constructing transition zones, which are wedges of backfilled soil used to mask the distinct difference between the native soils and the backfilled area (such as trenches for utilities). The transition zone should start at the trench walls, and a depth of 3 feet below the finished pavement, and rise at a slope of 1 vertical to 3 horizontal as it extends perpendicular to the trench. However, transition zones would not be necessary where EBS areas are backfilled with soils similar to the native soils, or where the native soils contain less than 30 percent material passing the #200 sieve.

Prior to placing the aggregate base material, the pavement subgrade should be prepared as recommended within this report. Crushed aggregate base course utilized below pavements should meet Section 305 of the WisDOT Standard Specifications for Road and Bridge Construction and the gradation should meet the "1¼ inch" specification. The crushed aggregate base course should be compacted to at least 95 percent of the maximum dry density obtained in accordance with ASTM D1557, Modified Proctor method. As an alternative, a dense graded base meeting the "3 inch" specification can be used for the lower 8 inches of the base course layer to bridge over softer subgrade soils.

The aggregate used in the bituminous mixture should meet the 19.0 mm gradation for the lower pavement layer and the 12.5 mm gradation for the upper pavement layer as specified in Section 460 of the WisDOT Standard Specifications for Road and Bridge Construction. The asphalt pavement should be compacted to a minimum of 93 percent of the theoretical density value.

Adequate construction joints, contraction joints and isolation joints should be provided in the areas of rigid pavement to reduce the impacts of cracking and shrinkage. Please refer to ACI 330R-92 *Guide for Design of Concrete Parking Lots*. The Guide recommends an appropriate spacing strategy for the anticipated loads and pavement thickness. It has been our experience that joint spacing closer to the minimum values results in a pavement with less cracking and better long-term performance.

Weather Restrictions: In this region, asphalt plants may close during the months of December through March, and/or April if particularly cold weather conditions prevail. However, this can change based on year to year temperature fluctuations. Daily temperatures from December to March will often stay below 40°F, limiting the days that asphalt placement can occur.

Pavement Drainage: An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrade and other problems related to the

deterioration of the pavement can be expected. The final pavement surface should be shaped or crowned to properly direct surface water to suitable on or off-site stormwater drainage infrastructure. In addition, the silty and clayey pavement subgrade should be properly sloped to avoid dips or pockets where water may become trapped. Dips in the silty or clayey subgrade could result in a “bathtub” effect, which may trap water and potentially soften the subgrade. Good drainage should help reduce the possibility of the subgrade materials becoming saturated over a long period of time.

Infiltration and subterranean water are generally the main sources of water that should be considered in the design of the pavement. Infiltration is surface water that enters the pavement through the joints, pores or cracks in the pavement, and through shoulders and areas adjacent to pavements as a result of precipitation. Subterranean water is a source of water from a high water table on the site. Based on our estimated groundwater level, we consider surface water infiltration to be the main source of water to be considered for pavement design on this project.

To reduce the potential for shallow perched water to develop in areas of the site, “stub” or “finger” drains should be considered around catch basins and in other low-lying areas to reduce the accumulation of water above and within the subgrade soils and aggregate base. As an alternative to the use of stub or finger drains, existing manholes and storm sewer inlets could be perforated with 1-inch diameter holes at 2-foot centers, and the manhole/inlet wrapped with a non-woven geotextile to reduce migration of material into the manhole/inlet. The holes could be placed at 90 degree intervals around the perimeter of the manhole, and the excavation around the manhole backfilled with free draining granular materials.

Sheet drainage across large pavement areas allows more water to enter the pavement through openings, cracks and weak points over time, which can adversely affect the base course and subgrade. This can increase the potential risk of premature pavement deterioration, distress and long-term pavement maintenance issues. Intermediate drains should be installed at adequate intervals to reduce the length of sheet flow across the pavement surface.

Pavement Maintenance: A sound maintenance program should be implemented to help maintain and enhance the performance of pavements, and help attain the design service life. A preventative maintenance program should be implemented early in the pavement life to be effective. The “standard in the industry” supported by research indicates that preventative maintenance should typically begin within 2 to 5 years of the placement of pavement. However, maintenance of pavement on undocumented fill sites may require more maintenance and sooner. Failure to perform preventative maintenance will reduce the service life of the pavement, and increase the costs for corrective maintenance and full pavement rehabilitation. To help reduce water infiltration thru the pavement section into the base course layer, which may result in softening of the subgrade and deterioration of the pavement, we recommend timely sealing of pavement joints and cracks with elastomeric caulk. We recommend exterior pavements be observed for distresses, such as cracks, depressions and poor drainage, at least twice a year, typically once in the spring and fall.

5.2 INFILTRATION DESIGN CONSIDERATIONS

The recommendations presented in this section follow the general guidelines of WDNR Conservation Practice Standard 1002, Site Evaluation for Stormwater Infiltration.

ECS understands a storm water management device would likely be constructed in the area of Boring 3 and 4. The "Soil and Site Evaluation – Storm" log included in Appendix B of this report indicate the storm water design parameters for each soil strata encountered in these borings. We determined the design infiltration rate using Table 2 of the Wisconsin Department of Natural Resources Conservation Practice Standards "Site Evaluation for Storm Water Infiltration (1002)".

Design Infiltration Rates: Based on the results of the exploration, the borings encountered soils that have a USDA soil classification of clay (c). Based on the soil textural classification and the guidelines provided in Table 2 of the WDNR Conservation Practice Standard 1002, the infiltration rate of the clay soils encountered in the borings is 0.07 inches per hour. The soil infiltration rate for each soil strata encountered in the borings can be found on the **Soil and Site Evaluation – Storm** form included in Appendix B of this report. Infiltration rates based on soil textural classification and the guidelines provided in Table 2 of the WDNR Conservation Practice Standard 1002 should be adjusted for the least permeable soil layer within 5-feet of each of the listed intervals.

Estimation of the final design infiltration rate should consider the effects of any engineered fill placed, surface vegetation, erosion control devices, and potential groundwater mounding. Prior to and during construction, the design infiltration rate of the soil at the basin bottom should be verified. Compaction of the basin bottom subgrade during and following construction should be prevented as this may reduce the infiltration rate of the soil. This may require exclusion of construction traffic from the infiltration bottom, or loosening of the subgrade soil, such as by raking or discing. Sediment allowed to accumulate at the basin bottom will reduce infiltration. Measures should be taken to reduce accumulation of sediment. Periodic removal of sediment should be expected.

Infiltration Feasibility: Based on the conditions encountered in the test borings, the site is considered to have a low capacity for the infiltration of storm water because of the predominant clayey soils encountered at the test boring locations. In accordance with Section V, Step C5 of the Wisconsin Department of Natural Resources (WDNR) Conservation Practice Standard 1002, the clayey soils have a correlated infiltration rate of 0.07 inches per hour, which is less than 0.6 inches per hour, and as such, these soils are anticipated to be exempt from the infiltration requirements per section NR 151.12(5)(c)6.a of the Wisconsin Administrative Code. In addition, if the bottom of the infiltration device extends to within 5 feet of the highest groundwater level noted in the borings, the location of the boring would be excluded from the infiltration requirements based on Chapter NR 151.12(5)(c)5.f of the Wisconsin Administrative Code.

Our scope of services is not inclusive of all steps involved in the initial site screening (Part A) of the WDNR Technical Standard 1002. Therefore, other conditions may exist at, or near the site that could exclude or exempt the site, or portions of the site from the infiltration requirements. Additional evaluation must be conducted prior to the design and implementation of an infiltration device at this site so that its construction meets Wisconsin Administrative Code requirements.

Details of the proposed storm water management device were not available at the time of this report preparation; it is recommended ECS be provided the storm water management plans, when available, to check that the recommendations provided herein are applicable. ECS should also be called on to provide observation and testing during infiltration basin construction.

6.0 SITE CONSTRUCTION RECOMMENDATIONS

6.1 SUBGRADE PREPARATION

6.1.1 Existing Utilities

ECS recommends utilities not reused should be capped-off and removed or properly abandoned in-place in accordance with local codes and ordinances. The excavations for utilities to be removed in the influence zone of new construction are recommended to be backfilled with engineered fill. Grading operations must be done carefully so that existing utilities are not damaged or disturbed. Utility invert elevations, depths and sizes should be checked relative to the planned utility and pavement elevations to determine what specific concerns are present.

6.1.2 Stripping and Initial Site Preparation

The subgrade preparation should consist of stripping all pavement to be removed, organic soils (topsoil) and any other soft or unsuitable materials from the 5-foot expanded pavement limits and 5 feet beyond the toe of engineered fills, where feasible. ECS should be called on to observe and document that topsoil and other unsuitable surficial materials have been removed prior to the placement of engineered fill or construction of structures. Please note, topsoil removal should not be based on soil coloration alone. After removal of the root mat, it may be possible to leave some darker soils in place provided the soil contains no more than 5 percent organic matter as determined by ASTM D2974, has the recommended strength characteristics and is stable under proofroll. A landscape architect should approve any topsoil or other materials proposed for use in future landscape areas.

6.1.3 Special Subgrade Preparations – Utilities

The existing fill encountered in the borings present concerns for the support of utility pipes and structures. The existing fill extended to a depth of between 2 and 5½ feet below the existing grade. The owner should be aware of an increased risk of settlement in excess of 1 inch associated with the construction of utilities on these soils. In our opinion, the risk would be high for utilities constructed on undocumented fill. Based on the anticipated acceptable risk level of the owner, ECS recommends the removal of all existing fill from below utility pipes and structures.

Excavations subcut below the proposed pipe or structure elevation should be oversized one foot horizontally in each direction for every foot of sub-base fill placed below the pipe or structure, to a maximum oversize of 3 feet on each side of the pipe. All over-excavated soils should be replaced with properly compacted engineered fill.

6.1.4 Special Subgrade Preparations – Pavements

In general, pavements derive their strength from the characteristics of the subgrade soils, the sub-base fill and the base course, and the concrete or bituminous upper layer and lower layer mixtures. In the design of the pavement, the total pavement thickness typically includes the concrete or bituminous mixtures, base course, and sub-base fill. The site has generally suitable conditions for the proposed pavement construction. However, the existing fill and frost susceptible soils encountered in the borings present concerns for the pavement performance.

Existing Fill: The existing fill encountered in the borings extended to a depth of between 2 and 5½ feet below the existing grade. The existing fill provides a concern for the performance of the pavement system. The owner should be aware of the increased risk for a reduced pavement performance associated with constructing pavements on undocumented fill. The risk exists because undocumented fill has a higher potential for variable density. In addition, this risk tends to increase with the presence of organic soils (more than 5% organics). However, because of natural soil variability, every construction site has at least a very low risk for a reduced pavement performance.

Based primarily on the standard penetration N-values, in ECS's opinion, the risk for reduced pavement performance associated with the existing fill at this site would generally be moderate to high. However, the risk could be reduced to a low risk if the existing fill contains less than 5 percent organic content *and* proof-rolling observations do not indicate rutting or deflection greater than 1 inch. Based on our assumption of the owner's acceptable level of risk, we recommend removing any existing fill which contains greater than 5 percent organic content or does not meet the above proof-rolling requirements from within 2 feet of the finished pavement grade. The removed material should then be replaced with a compacted engineered fill in accordance with the **Earthwork Operations** section of this report.

Frost Susceptible Soils: The frost susceptible clayey and silty soils encountered in the borings provide another concern for the pavement system. ECS wishes to note, a risk for reduced pavement performance exists with the construction of pavements on frost susceptible soil. The reduced pavement performance may occur because of potential detrimental frost heaving and spring thaw weakening. The risk associated with frost susceptible soils can be reduced by removal of all frost susceptible soils within 3 feet of the finished pavement grade. In our opinion, the risk at this site related to the frost susceptible soils would generally be moderate. However, the risk would be high to very high in areas where highly frost susceptible silt, silty clay, or sandy silty clay soil is present within 3 feet of the finished pavement grade.

Summary: Based on our assumption of the owner's acceptable risk level (as outlined in the "Project Information" section of this report), we recommend the following:

1. Remove all existing fill soils from within 2 feet of the finished pavement grade, unless it contains less than 5 percent organic content *and* proof-rolling observations do not indicate rutting or deflection greater than 1 inch.
2. All over-excavated material should be replaced with compacted engineered fill in accordance with the **Earthwork Operations** section of this report.
3. If the owner is willing to accept a moderate risk for reduced pavement performance, then we anticipate a majority of the frost susceptible soils will remain in place below pavements. However, we recommend removing all highly frost susceptible soils (e.g. silt, silty clay and sandy silty clay) from within 3 feet of the finished pavement grade.

6.1.5 Proofrolling

After the removal of all unsuitable surface materials, cutting to the proposed subgrade, and prior to the placement of any engineered fill or other construction materials, the exposed subgrade should be observed by ECS. The contractor should thoroughly proofroll the exposed subgrade with previously approved construction equipment having a minimum axle load of 10 tons (e.g. fully loaded tandem-axle dump truck in clayey soils or large smooth drum roller in sandy soils). The contractor should traverse the areas subject to proofrolling by the equipment in two perpendicular (orthogonal) directions with overlapping passes of the vehicle under the observation of ECS. This procedure is intended to assist in identifying any localized yielding materials. Unstable or pumping subgrade areas identified during the proofroll should be marked for repair prior to the placement of any subsequent engineered fill or other construction materials. Unstable subgrade repair methods, such as undercutting or moisture conditioning or chemical stabilization, should be discussed with ECS to determine the appropriate procedure(s) with regard to the existing conditions causing the instability. A test pit(s) may be excavated to explore the shallow subsurface materials in the area of the instability to aid in determining the cause of the observed unstable materials and to assist in the evaluation of the appropriate remedial action to stabilize the subgrade.

Near surface subgrade soils having a high moisture content and/or those having N-values less than 10 bpf may not pass a proofroll, and may need to be undercut or repaired. Some undercutting or repair of unstable subgrade soils should be anticipated during pavement subgrade preparation. If construction will occur during wet times of the year (such as during the spring or fall months) or immediately following extended periods of rain, then seasonal reduction of the near surface soil strength will occur. This may cause additional unstable or pumping subgrade areas for constructability concerns.

The actual quantity of the subgrade undercut or stabilization should be determined by ECS at the time of construction.

6.1.6 Site Temporary Dewatering

We anticipate utility excavations will likely extend below the groundwater level encountered in Boring 7. Further, seasonal variations in precipitation and site drainage conditions can cause the accumulation of water in the upper soils, particularly within existing fill and more permeable granular soils underlain by less permeable clayey soils. Where excavations extend less than 2 feet below the groundwater level, initial attempts to control water may be accomplished by pumping from sump pits in the excavation bottom, which are backfilled with AASHTO Size No. 57 Stone or open-graded bedding material. If water control cannot be maintained with sump pumps, or where excavations extend more than 2 feet below the static groundwater level, a more substantial excavation dewatering system, such as a temporary well point system, may be required to control groundwater seepage during construction. ECS recommends the contractor be required to submit a Dewatering Plan as part of the project specifications for water conditions beyond the capability of pumping from sumps.

More complex dewatering techniques, such as vacuum wells or other methods, should be started prior to excavation to prevent "boiling" and/or "heaving" of the subgrade soils. Dewatering should continue until all earthwork operations and backfilling have extended above the water table.

Lowering the static groundwater level can adversely affect nearby structures, utilities and other construction. We recommend any dewatering scheme be reviewed by ECS and a contractor who specializes in this type of work prior to its implementation.

6.1.7 Subgrade Stabilization

Subgrade Benching: Fill should not be placed on ground with a slope steeper than 5H:1V. The ground should be benched so as to allow for fill placement on a horizontal surface.

Subgrade Compaction: Upon completion of subgrade documentation, the exposed subgrade within the 5-foot expanded pavement area and embankment limits should be moisture conditioned to within +/- 3 percent of the soil's optimum moisture content to a depth of 10 inches, and be compacted with suitable equipment (minimum 10-ton vibratory roller for granular soils or a sheepsfoot roller for cohesive soils). The subgrade within the expanded pavement limits should be compacted to a dry density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557). Beyond these areas, compaction should be to at least 90 percent. ECS should be called on to document the achievement of proper subgrade compaction.

Subgrade Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits for structures, pavements, fills, and slopes, etc. We recommend performing field density testing of subgrade soils at the frequencies listed in Table 6.1.1 of this report.

Table 6.1.1 Frequency of Subgrade Compaction Testing

Location	Frequency of Tests
Pavement Areas	1 test per 10,000 sq. ft.
Other Non-Critical Areas	1 test per 10,000 sq. ft.

6.2 EARTHWORK OPERATIONS

6.2.1 Engineered Fill Materials

Product Submittals: Prior to placement of engineered fill, representative bulk samples (about 50 pounds) of on-site and off-site borrow should be submitted to ECS for laboratory testing, which will include natural moisture content, grain-size distribution, and moisture-density relationships for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Satisfactory Engineered Fill Materials: Engineered fills should consist of approved materials, free of organic matter and debris, contain no particle sizes greater than 3 inches in the largest dimension, and have a Liquid Limit and Plasticity Index less than 40 and 15, respectively. Open-graded materials, such as coarser sands and gravels (SP and GP), which contain void space in their mass should not be used in engineered fills unless properly encapsulated within a filter geotextile. If the fill is to provide non-frost susceptible characteristics, it must be classified as a clean GW, GP, SW or SP per Unified Soil Classification System (ASTM D-2487).

Unsatisfactory Materials: Unsatisfactory engineered fill materials, which do not satisfy the requirements for suitable materials, include topsoil and organic materials (PT, OH, OL), silt (ML), sandy silt (ML), elastic Silt (MH), silty clay (CL-ML), sandy silty clay (CL-ML) and high plasticity clay (CH). Topsoil is not recommended to be used as engineered fill, but may be suitable for use within future landscape areas. A landscape architect should approve any materials proposed for use in future landscape areas.

Pea gravel is not recommended to be used as engineered fill. Pea gravel has round/smooth characteristics, no fines and does not interlock when compacted, which makes it more susceptible to future movement and instability resulting in excessive and variable settlement.

On-Site Borrow Suitability: The on-site soil, with the exception of silt (ML), silty clay (CL-ML) and sandy silty clay (CL-ML), may be feasible to use as engineered fill, but should be further evaluated and approved by ECS prior to its use. On-site soil used as engineered fill must not contain an adverse amount of organic matter, and must be free of frozen matter, deleterious materials, over-sized material (maximum 3-inch particle diameter), or chemicals that may result in the material being classified as "contaminated." Depending on the conditions at the time of construction, the use of on-site soil for foundation support may not be practical, and use of an imported high quality granular material may be needed for foundation support. The material used as engineered fill must be considered low volume change material with a maximum Liquid Limit of 40 and maximum Plasticity Index of 15, unless specifically tested and found to have low volume change properties and approved by ECS. The soils must be compacted within a narrow range of the materials optimum moisture content. The soil samples had relatively high moisture contents so the contractor should expect some drying of on-site soil prior to reuse as engineered fill. The soil should not be compacted too dry as it may lose its apparent stability if it later becomes wet. The suitability of engineered fill materials should be checked by ECS prior to placement. Sorting to remove over-sized material (i.e. cobbles) should be expected at this site prior to re-use of the on-site soil as engineered fill.

Natural soil deposits considered unsuitable by virtue of their plasticity are present on the site. The moisture contents of many of the samples were observed to generally be more than 5 percent above the optimum moisture contents of the material. The construction team should anticipate moisture conditioning (mostly drying) of subgrade soils and engineered fill lifts at this site. Soil chemical modification may be helpful to reduce moisture contents of subgrade soils and fills.

6.2.2 Compaction

Engineered Fill Compaction: Engineered fill within the expanded pavement, and embankment limits should be placed in maximum 8-inch thick loose lifts, moisture conditioned as necessary to within +/- 3 percent of the soil's optimum moisture content, and be compacted with suitable equipment to a dry density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557). Beyond these areas, the engineered fill should be compacted to at least 90 percent. ECS should be called on to document the achievement of proper fill compaction.

Fill Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits of the fill zones for pavements and embankment slopes, etc., at the time of fill placement. Grade controls should be maintained throughout the filling operations. All filling operations should be observed on a full-time basis by a qualified representative of ECS to

document the achievement of the minimum compaction requirements. Field density testing of fills should be performed at the frequencies shown in Table 6.2.1, but not less than 2 tests per lift.

Table 6.2.1 Frequency of Compaction Tests in Fill Areas

Location	Frequency of Tests
Pavement Areas	1 test per 10,000 sq. ft. per lift
Utility Trenches	1 test per 200 linear ft. per lift
All Other Non-Critical Areas	1 test per 10,000 sq. ft. per lift

Compaction Equipment: Compaction equipment suitable to the soil type being compacted should be used to compact the subgrades and fill materials. Sheepsfoot compaction equipment should be suitable for the fine-grained soils (Clays). A vibratory steel drum roller or plate compactor should be used for compaction of coarse-grained soils (Sands and Gravels) as well as for sealing compacted surfaces.

Fill Placement Considerations: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and all frozen or frost-heaved soils should be removed prior to placement of engineered fill or other fill soils and aggregates. Scarify, aerate and moisture condition excessively wet soils or aggregates.

At the end of each work day, all fill areas should be graded to facilitate drainage of any precipitation and the surface should be sealed by use of a smooth-drum roller to limit infiltration of surface water. During placement and compaction of new fill at the beginning of each workday, the contractor may need to scarify existing subgrades to a depth of 4 inches or more so that a weak plane will not be formed between the new fill and the existing subgrade soils.

Drying and compaction of wet soils is typically difficult during the cold, winter months. Accordingly, earthwork should be performed during the warmer, drier times of the year, if practical. Proper drainage should be maintained during the earthwork phases of construction to reduce ponding of water which has a tendency to degrade subgrade soils. Alternatively, if these soils cannot be stabilized by conventional methods as previously discussed, chemical modifications of the subgrade soils, such as with lime, cement or other materials, may be utilized to adjust the moisture content. If lime or cement is utilized to control moisture contents and/or for stabilization, then ECS recommends the use of Quick Lime, Calciment® or regular Type 1 cement. The soil modification procedure, such as determination of the quantity of additive, and mixing and curing procedures, should be evaluated before implementation. The contractor should be required to minimize dusting or implement dust control measures.

Where fill materials will be placed to widen existing embankment fills, or placed up against sloping ground, the soil subgrade should be scarified, and the new fill benched and keyed into the existing material. Fill material should be placed in horizontal lifts. In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 inches to 4 inches may be required to achieve specified degrees of compaction.

We recommend the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. We do not anticipate significant problems in controlling moisture during dry

weather, but moisture control may be difficult during winter months or extended periods of rain. The control of moisture content of clay soils can be difficult when these soils become wet. Further, construction traffic can easily degrade soils that have an elevated moisture content.

6.3 PAVEMENT SUBGRADE OBSERVATIONS

Pavement Subgrade Verification: ECS should be called on to observe and test exposed subgrade within the expanded pavement limits prior to engineered fill placement and pavement construction to check achievement of adequate subgrade preparation. A proofroll using a loaded dump truck should be performed in their presence at that time. Once subgrades have been prepared to the satisfaction of ECS, subgrades should be properly compacted and new engineered fill can be placed. Existing subgrades to a depth of at least 10 inches and all engineered fill should be properly moisture conditioned and compacted to the required in-place density. ECS should check the condition of the prepared subgrade prior to placement of the subbase stone and pavement. If there will be significant time lag between the subgrade check and placement of the subbase stone and pavement, ECS may need to recheck the condition of the subgrade before placement of stone and pavement. Prior to final pavement construction, the subgrade may require scarification, moisture conditioning, and re-compaction to restore stable conditions.

6.4 UTILITY INSTALLATIONS

Utility Subgrades: The native soils encountered in our exploration are expected to be generally suitable for support of utility pipes. However, we recommend removing all existing fill and soils that contain more than 5 percent organic content from below utilities. The pipe subgrade should be observed and probed for stability by ECS to evaluate the suitability of the encountered materials. Any loose or unsuitable materials encountered at the utility pipe subgrade elevation should be removed and replaced with suitable compacted engineered fill or pipe bedding material.

Utility Backfilling: The granular bedding material should be at least 4 inches thick, but not less than that specified by the project drawings and specifications. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for engineered fill given in this report. Compacted backfill should be free of topsoil, roots, ice, or any other material designated by ECS as unsuitable. The backfill should be moisture conditioned, placed, and compacted in accordance with the recommendations of this report.

6.5 GENERAL CONSTRUCTION CONSIDERATIONS

Moisture Conditioning: During the cooler and wetter periods of the year, the construction team should anticipate delays and additional costs. At these times, reduction of soil moisture may need to be accomplished by mechanical manipulation to lower moisture contents to levels appropriate for compaction. Alternatively, during the drier times of the year, such as the summer months, moisture may need to be added to the soil to provide adequate moisture for successful compaction according to the project requirements.

Subgrade Protection: Measures should be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development areas, including pavement areas. ECS recommends the design team consider designating a haul road and construction staging area to limit the areas of disturbance and to prevent construction

traffic from excessively degrading sensitive subgrade soils and existing pavement areas. Haul roads and construction staging areas could be covered with excess depths of aggregate to protect those subgrades. The aggregate can later be removed and used in pavement areas provided it has not been mixed with silty or clayey soils.

Surface Drainage: The contractor should properly maintain surface drainage conditions. Surface water should be directed away from the construction area, and the work area should be sloped away from the construction area at a gradient of 1 percent or steeper to reduce the potential of ponding water and the subsequent saturation of the surface soils. At the end of each work day, the subgrade soils should be sealed by rolling the surface with a smooth drum roller to reduce infiltration of surface water.

Excavation Safety: The contractor should make and maintain all excavations and slopes in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing and constructing stable, excavations and slopes and should shore, slope, or bench the sides of the excavations and slopes as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in OSHA 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; ECS does not imply such responsibility, and the contractor, design team and owner should not infer it.

Excavation Instability: Excavation stability and caving problems may occur due to the existing fill soils. The instability problems will generally depend upon the excavation depth, length of time the excavations remain open, inclination of excavation side-walls, magnitude and location of surcharges near the excavations, groundwater levels and the suitability of any dewatering systems if needed.

Excavation Difficulties: Excavation difficulties for utilities and other construction may occur due to the presence of existing utilities. The degree of excavation difficulty will generally depend upon the depth of excavation and capabilities of the excavation equipment.

Existing Construction Considerations: Site preparation will require complete removal and proper disposal of the existing pavement to be removed and any remnants of previous construction, including all underground utilities that are not reused, etc. Disposal of debris should be in accordance with local, state and federal regulations for the material type. It should be noted that any construction remnants left in-place may cause excavation difficulties for new utilities and/or landscape plantings. All excavations must be backfilled with compacted engineered fill performed under engineering controlled conditions.

Removal of the existing pavement and placement of engineered backfill is recommended to be observed and tested by ECS. Alteration to the recommendations of this report may be needed, if conditions different than those noted on the boring logs are revealed below the existing construction.

Existing Fill Considerations: Existing fill was encountered in a majority of the test boring locations. Unsuitable materials may have been buried beneath the site surface during previous site grading or construction not detected by the test borings. Questionable material, if encountered, is recommended to be evaluated by ECS to determine if the material needs to be removed and replaced with engineered fill. Alteration to the recommendations of this report may be needed, if excavations reveal conditions different than those noted on the test boring logs.

Erosion Control: The surface soils may be erodible. Therefore, the Contractor should provide and maintain good site drainage during earthwork operations to maintain the integrity of the surface soils. All erosion and sedimentation controls should be in accordance with sound engineering practices and local requirements.

Bidding/Estimating Considerations: Contractors bidding or undertaking any work at the site should examine the results of the subsurface exploration, satisfy themselves as to the adequacy of the information for bidding and construction, make their own interpretation of the data, and consider the effect it may have on their cost proposal, construction techniques, schedule, and equipment capabilities. Furthermore, contractors should complete any additional fieldwork and investigation they deem necessary to properly prepare a cost proposal for the site work. Soil borings do not provide the same wide-scale view of the subsurface conditions that is obtained during site grading, excavation or other aspects of earthwork construction. Additional scope may be required to obtain more detailed subsurface information needed for earthwork bid preparation, which could include test pits to better understand the lateral and vertical extents of the subsurface materials of concern such as existing undocumented fill. Even with this additional information, budget contingencies should be carried in construction to help cover potential variations in subsurface conditions.

7.0 CLOSING

ECS has prepared this report of findings, evaluations, and recommendations to guide geotechnical-related design and construction aspects of the project.

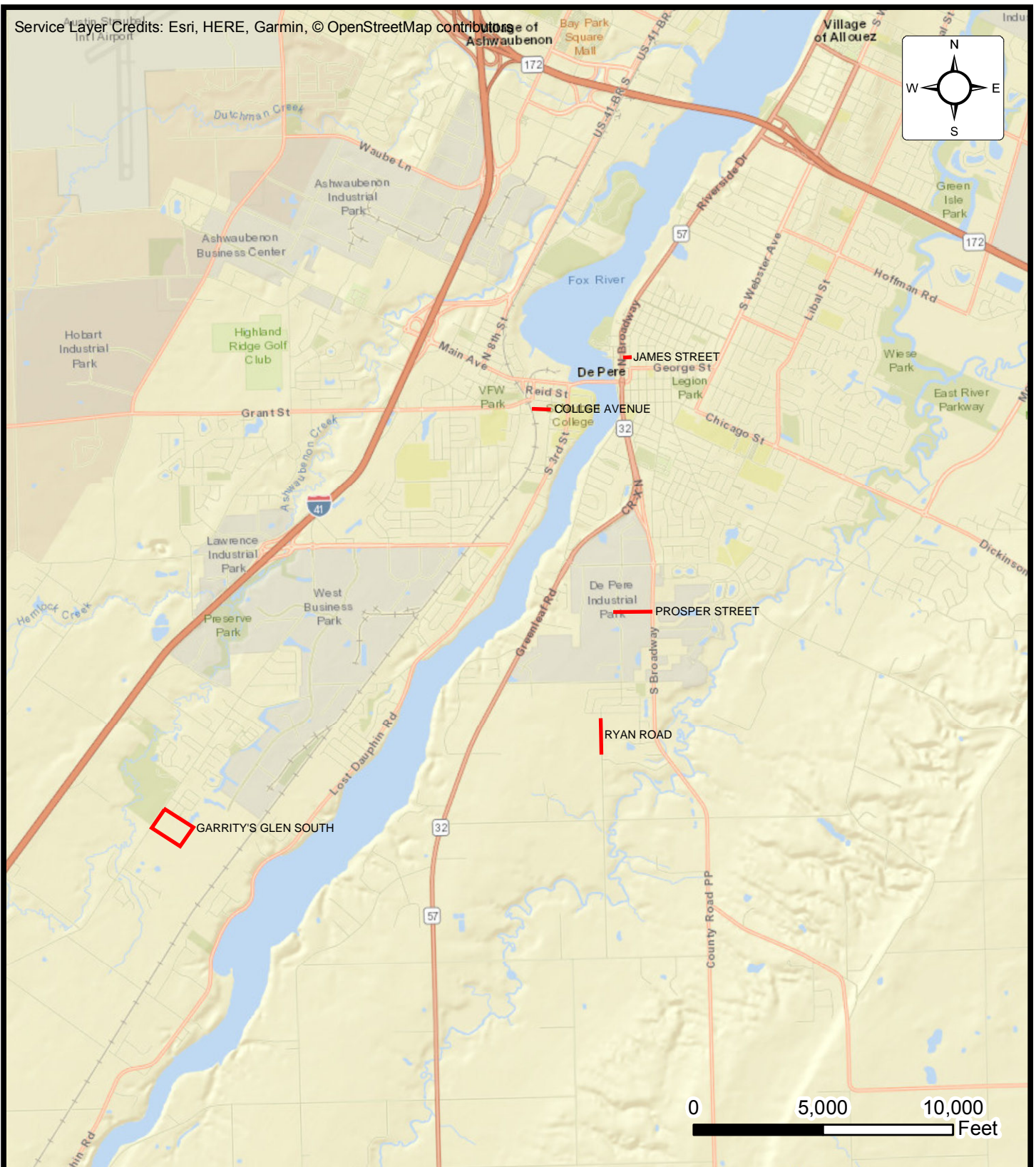
The description of the proposed project is based on information provided to ECS by the City of De Pere. If any of this information is inaccurate, either due to our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted immediately so that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed construction.

We recommend that ECS be allowed to review the project's plans and specifications pertaining to our work so that we may ascertain consistency of those plans/specifications with the intent of this geotechnical report.

Field observations, and quality assurance testing during earthwork, utility and pavement installation are an extension of and integral to the geotechnical design recommendation. We recommend the owner retain these quality assurance services and that ECS be allowed to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Drawings & Reports

Site Location Diagram
Boring Location Diagram



Site Location Diagram 2019 CONSTRUCTION DESIGN

VARIOUS STREETS, DE PERE, WI

CITY OF DE PERE

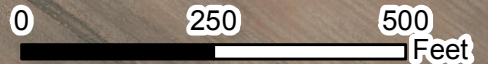
ENGINEER	MEK
SCALE	1" = 5280'
PROJECT NO.	59:1549
SHEET	1 OF 1
DATE	11/21/2018



Legend



Approximate Boring Locations

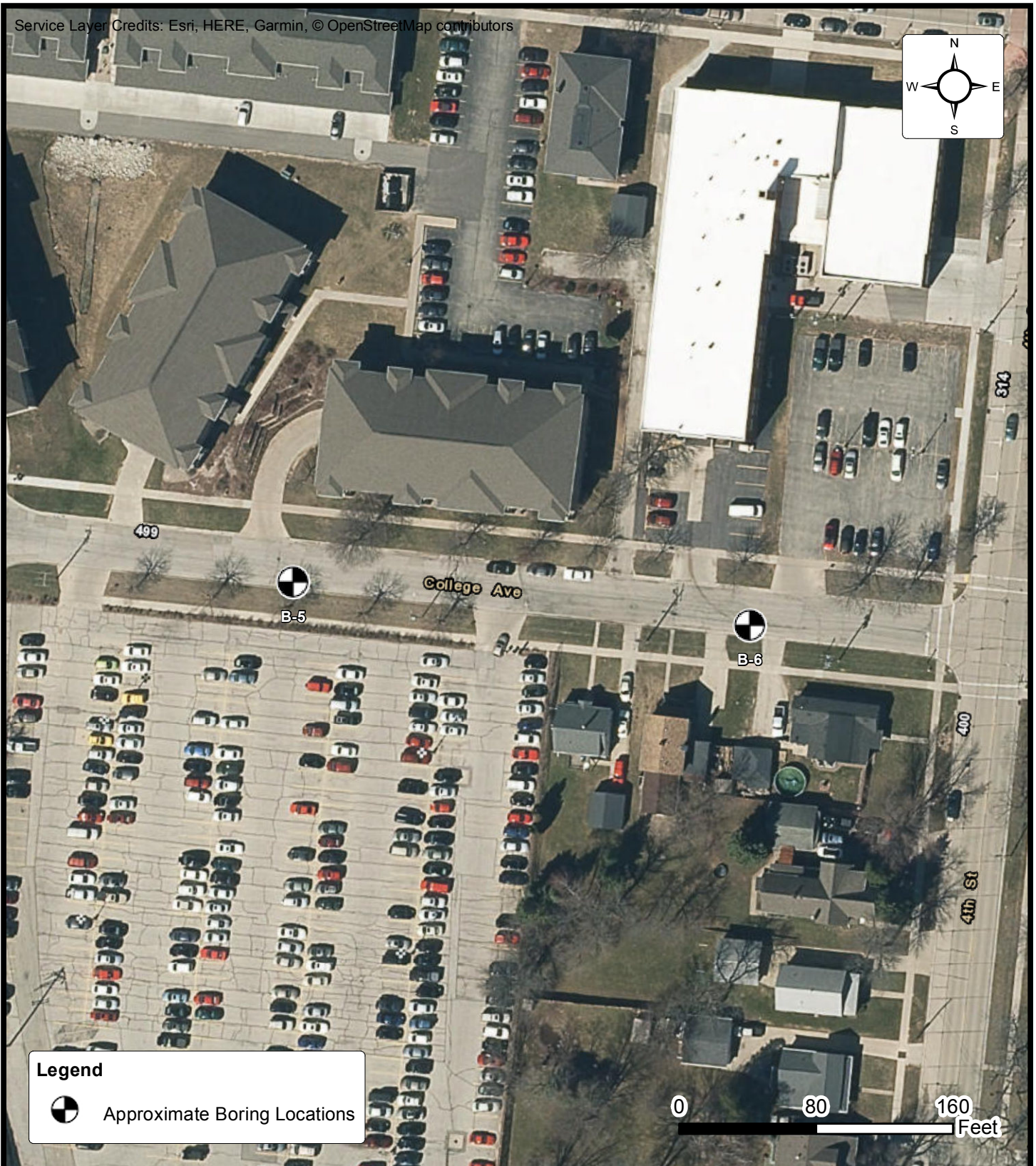
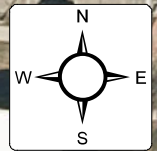


Boring Location Diagram 2019 CONSTRUCTION DESIGN

GARRITY'S GLEN SOUTH, DE PERE, WI

CITY OF DE PERE

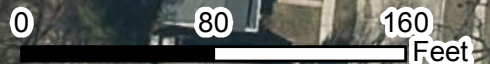
ENGINEER	MEK
SCALE	1" = 250'
PROJECT NO.	59:1549
SHEET	1 OF 1
DATE	12/17/2018



Legend



Approximate Boring Locations



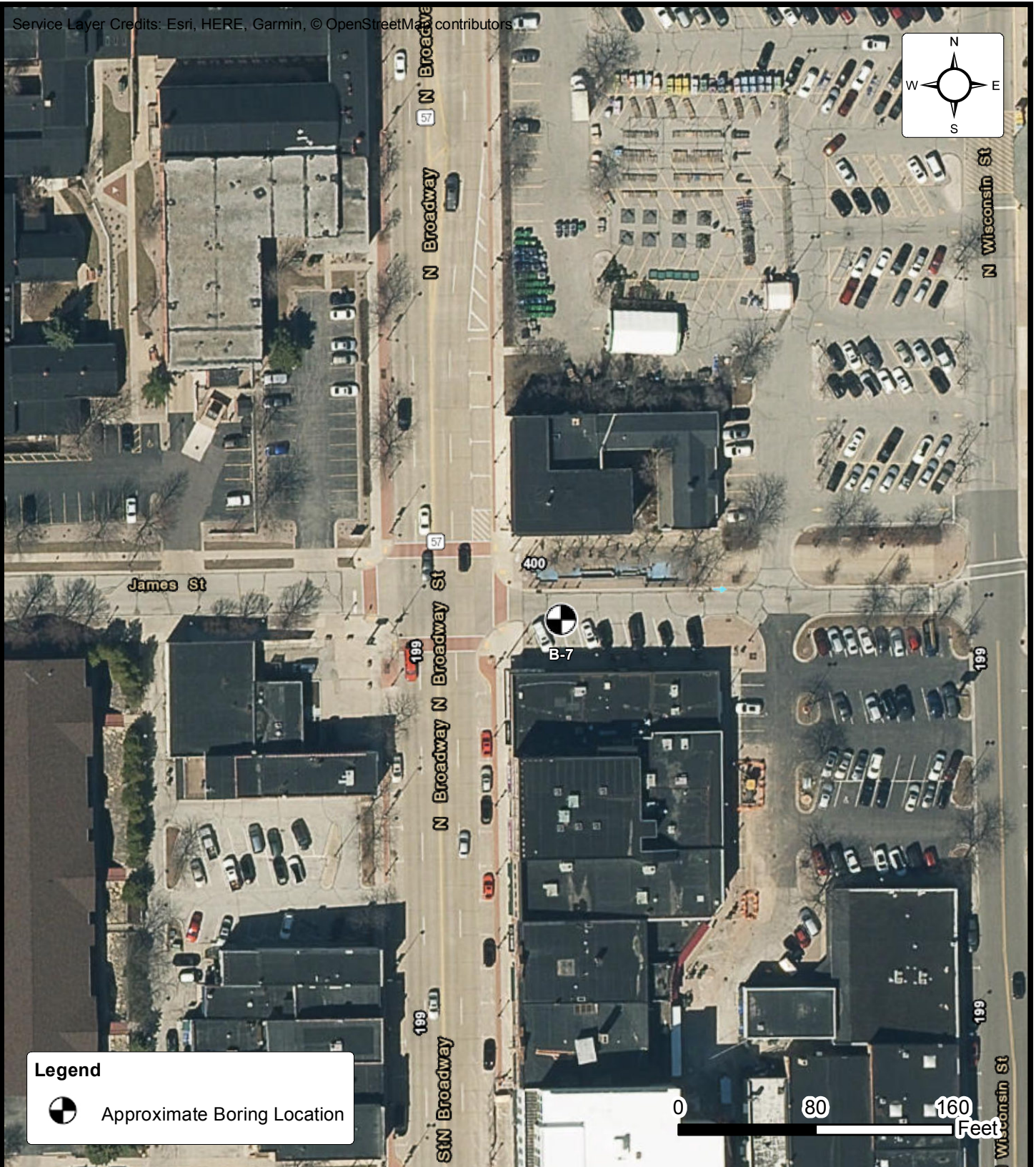
Boring Location Diagram

2019 CONSTRUCTION DESIGN

COLLEGE AVENUE, DE PERE, WI

CITY OF DE PERE

ENGINEER	MEK
SCALE	1" = 80'
PROJECT NO.	59:1549
SHEET	1 OF 1
DATE	12/17/2018



Legend



Approximate Boring Location



Boring Location Diagram 2019 CONSTRUCTION DESIGN

JAMES STREET, DE PERE, WI

CITY OF DE PERE

ENGINEER	MEK
SCALE	1" = 80'
PROJECT NO.	59:1549
SHEET	1 OF 1
DATE	12/17/2018



Legend



Approximate Boring Locations



Boring Location Diagram 2019 CONSTRUCTION DESIGN

PROSPER STREET, DE PERE, WI

CITY OF DE PERE

ENGINEER	MEK
SCALE	1" = 250'
PROJECT NO.	59:1549
SHEET	1 OF 1
DATE	12/17/2018



Legend



Approximate Boring Locations



Boring Location Diagram 2019 CONSTRUCTION DESIGN

RYAN ROAD, DE PERE, WI

CITY OF DE PERE

ENGINEER	MEK
SCALE	1" = 250'
PROJECT NO.	59:1549
SHEET	1 OF 1
DATE	12/17/2018

APPENDIX B – Field Operations

Reference Notes for Boring Logs
Test Boring Log 1 through 11
Soil and Site Evaluation – Storm



REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	SHALE
	BRICK
	AGGREGATE BASE COURSE
	FILL³ MAN-PLACED SOILS
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION	
DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Gravel: Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Sand: Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Sand: Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, Q _p ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Medium Stiff
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
Dual Symbol (ex: SW-SM)	10	10
With	15 - 20	15 - 25
Adjective (ex: "Silty")	≥25	≥30

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶		
	WL	Water Level (WS)(WD) (WS) While Sampling (WD) While Drilling
	SHW	Seasonal High WT
	ACR	After Casing Removal
	SWT	Stabilized Water Table
	DCI	Dry Cave-In
	WCI	Wet Cave-In

¹Classifications and symbols per ASTM D 2488-09 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf).

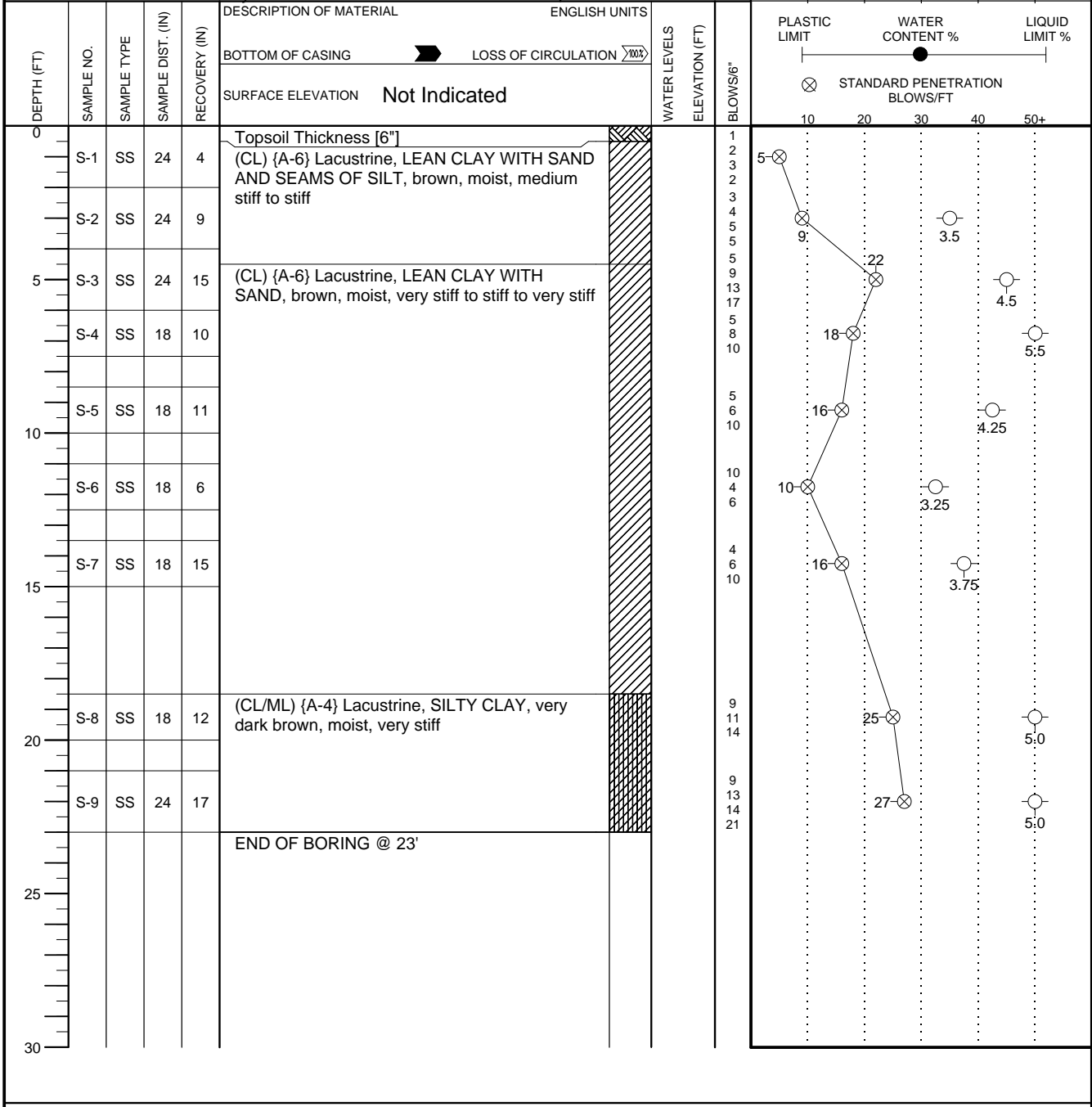
⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-09 Note 16.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-09.

CLIENT City of De Pere	JOB # 1549	BORING # 1	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		
Additional info. Garry's Glen South	Station+Offset	

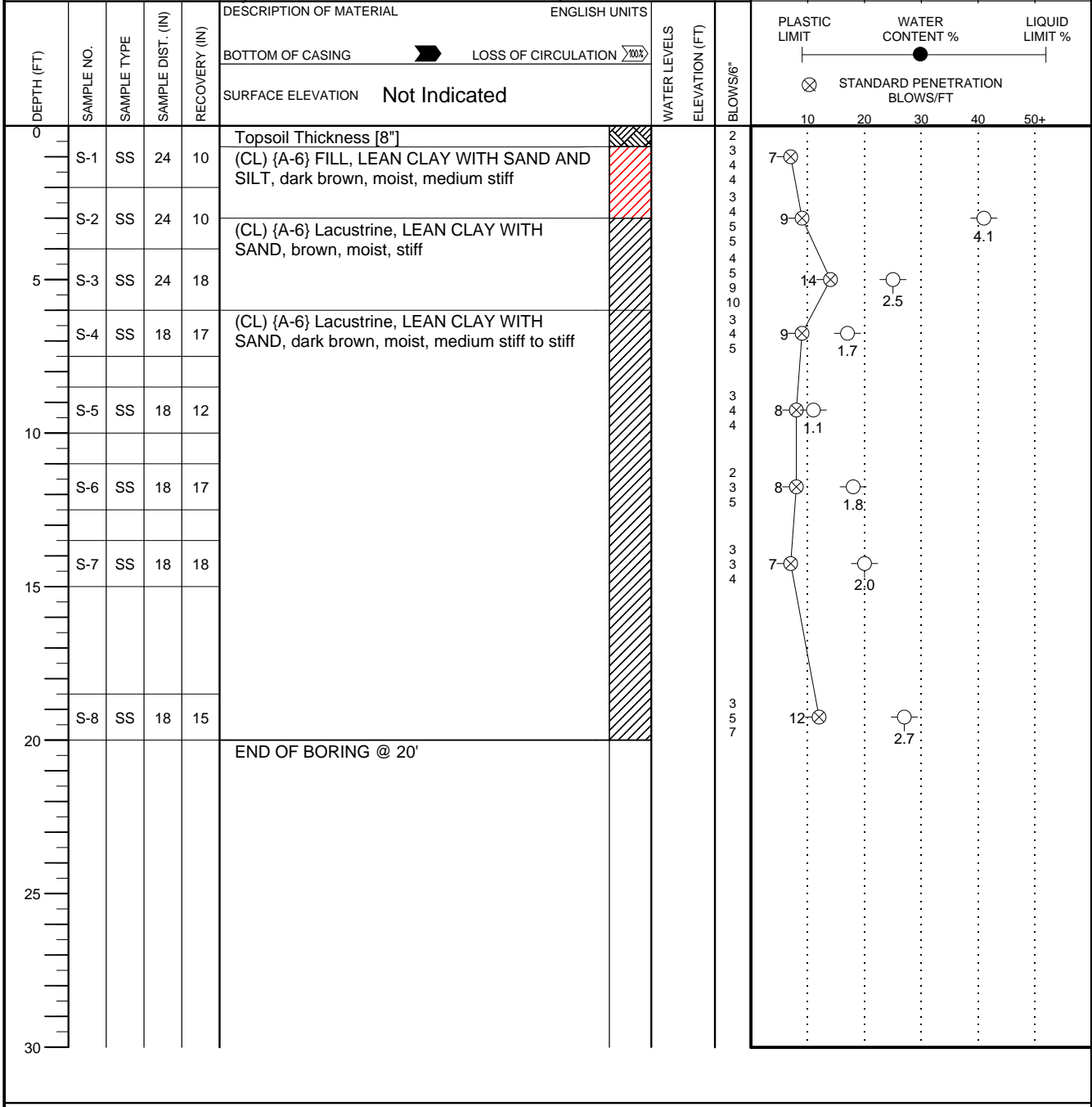


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/26/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/26/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 23' (AH)		

CLIENT City of De Pere	JOB # 1549	BORING # 2	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — — — — — REC.% — — — — — 20% 40% 60% 80% 100%
Additional info. Garry's Glen South	Station+Offset	

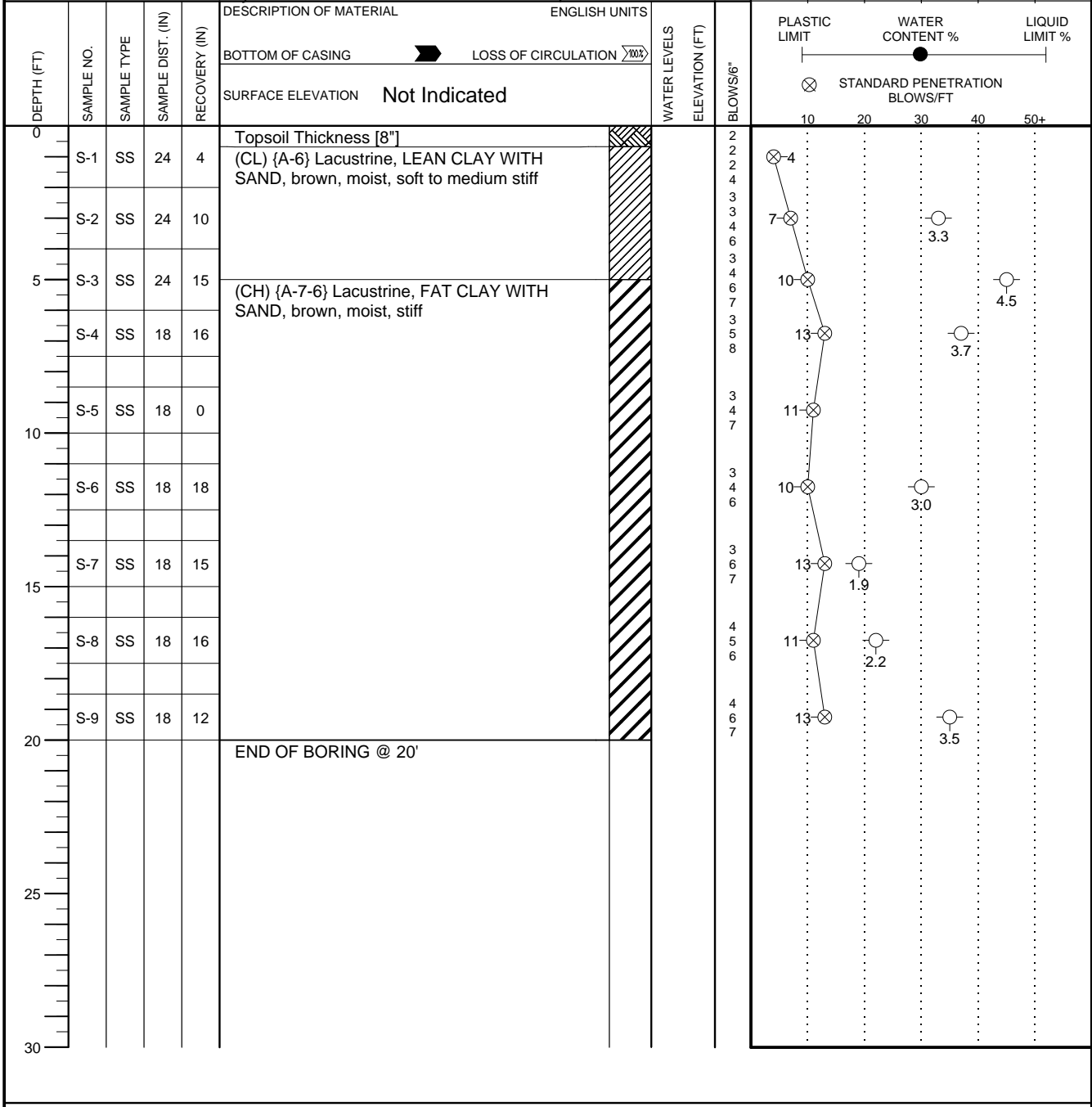


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/26/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/26/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 20' (AH)		

CLIENT City of De Pere	JOB # 1549	BORING # 3	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — REC.% — 20% 40% 60% 80% 100%
Additional info. Garry's Glen South	Station+Offset	

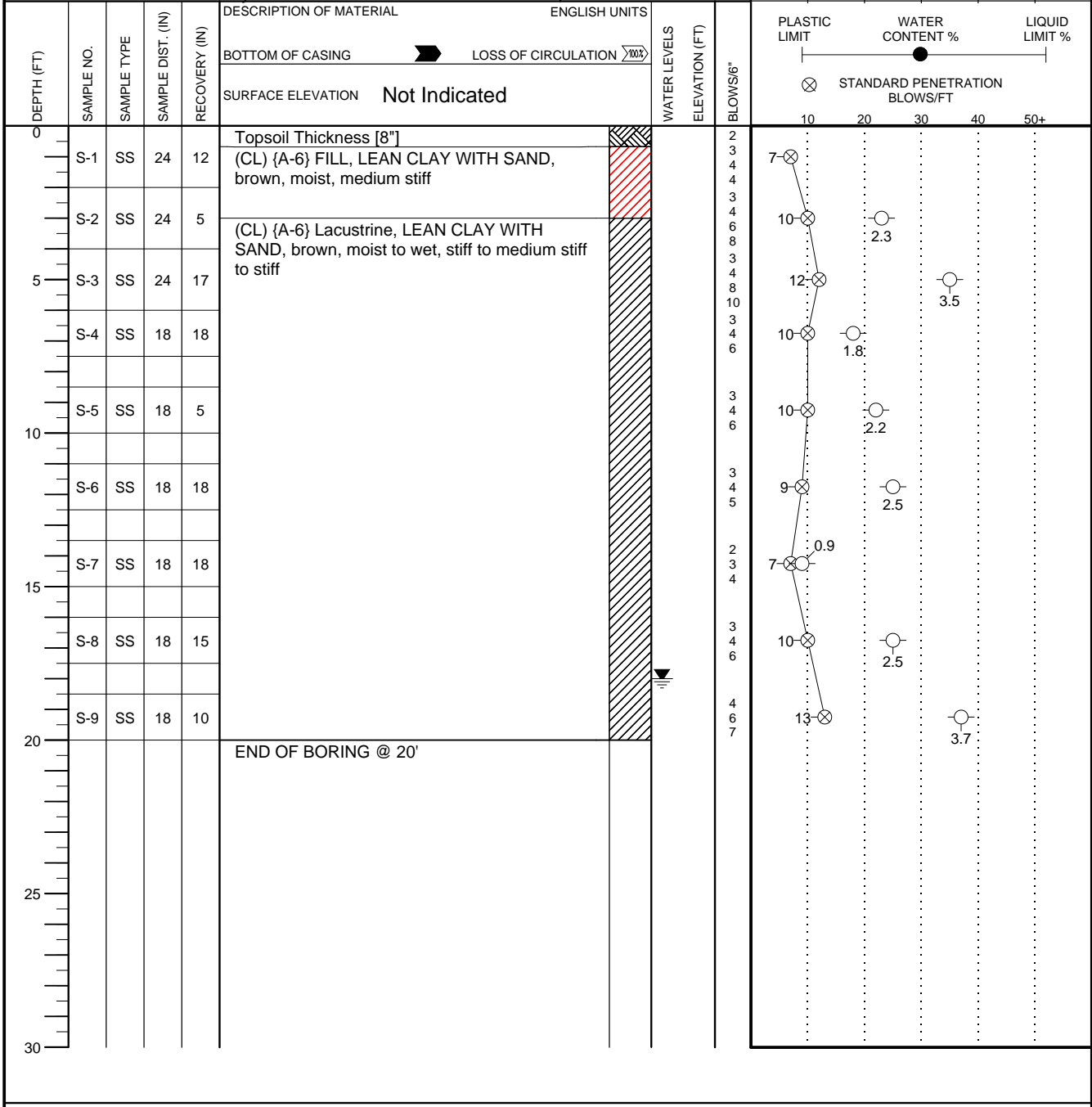


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/26/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/26/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 20' (AH)		

CLIENT City of De Pere	JOB # 1549	BORING # 4	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		
Additional info. Garry's Glen South	Station+Offset	

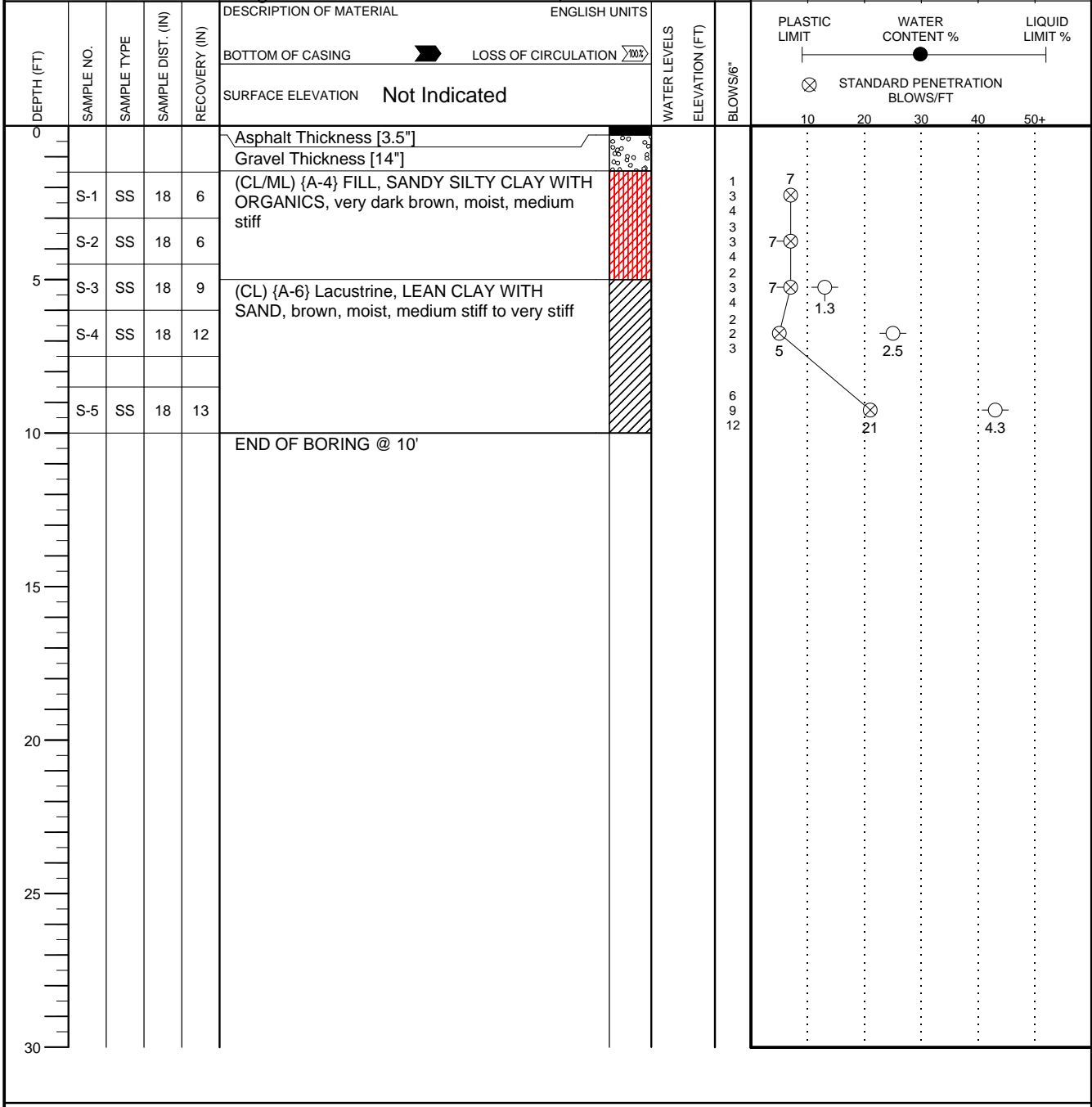


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/26/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) 18 feet		BORING COMPLETED	11/26/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 20' (AH)		

CLIENT City of De Pere	JOB # 1549	BORING # 5	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		○ CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — — — — — REC.% — — — — — 20% 40% 60% 80% 100%
Additional info. College Avenue	Station+Offset	PLASTIC LIMIT — — — — — WATER CONTENT % — — — — — LIQUID LIMIT % ⊗ STANDARD PENETRATION BLOWS/FT 10 20 30 40 50+

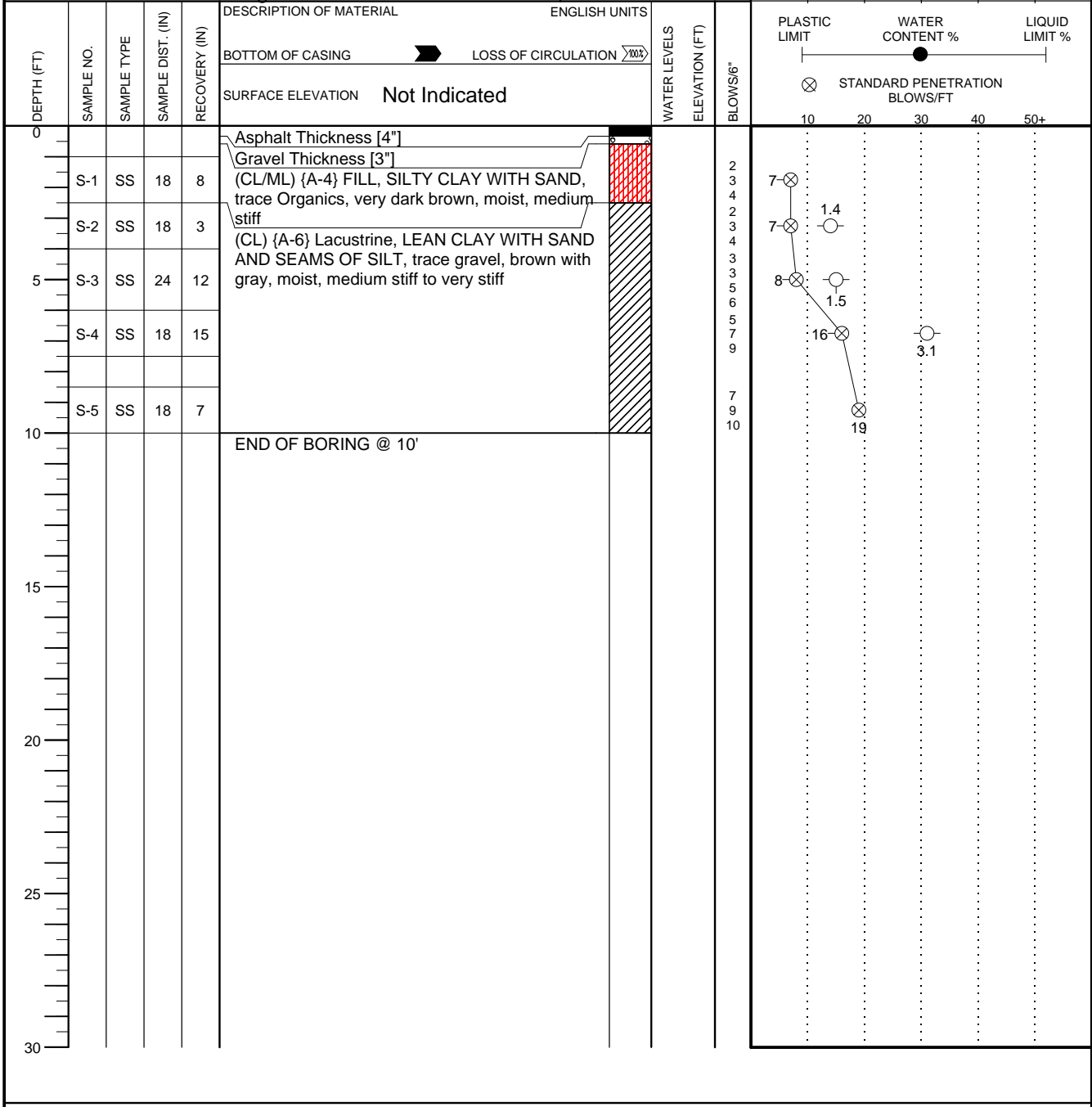


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None <input type="checkbox"/> WS <input checked="" type="checkbox"/> WD	BORING STARTED	11/27/18	
<input checked="" type="checkbox"/> WL(BCR) <input checked="" type="checkbox"/> WL(ACR) None	BORING COMPLETED	11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL	RIG	ATV	FOREMAN GB/BB
DRILLING METHOD 3 1/4" HSA 0' to 10' (AH)			


CLIENT City of De Pere	JOB # 1549	BORING # 6	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — — — — — REC.% — — — — — 20% 40% 60% 80% 100%
Additional info. College Avenue	Station+Offset	

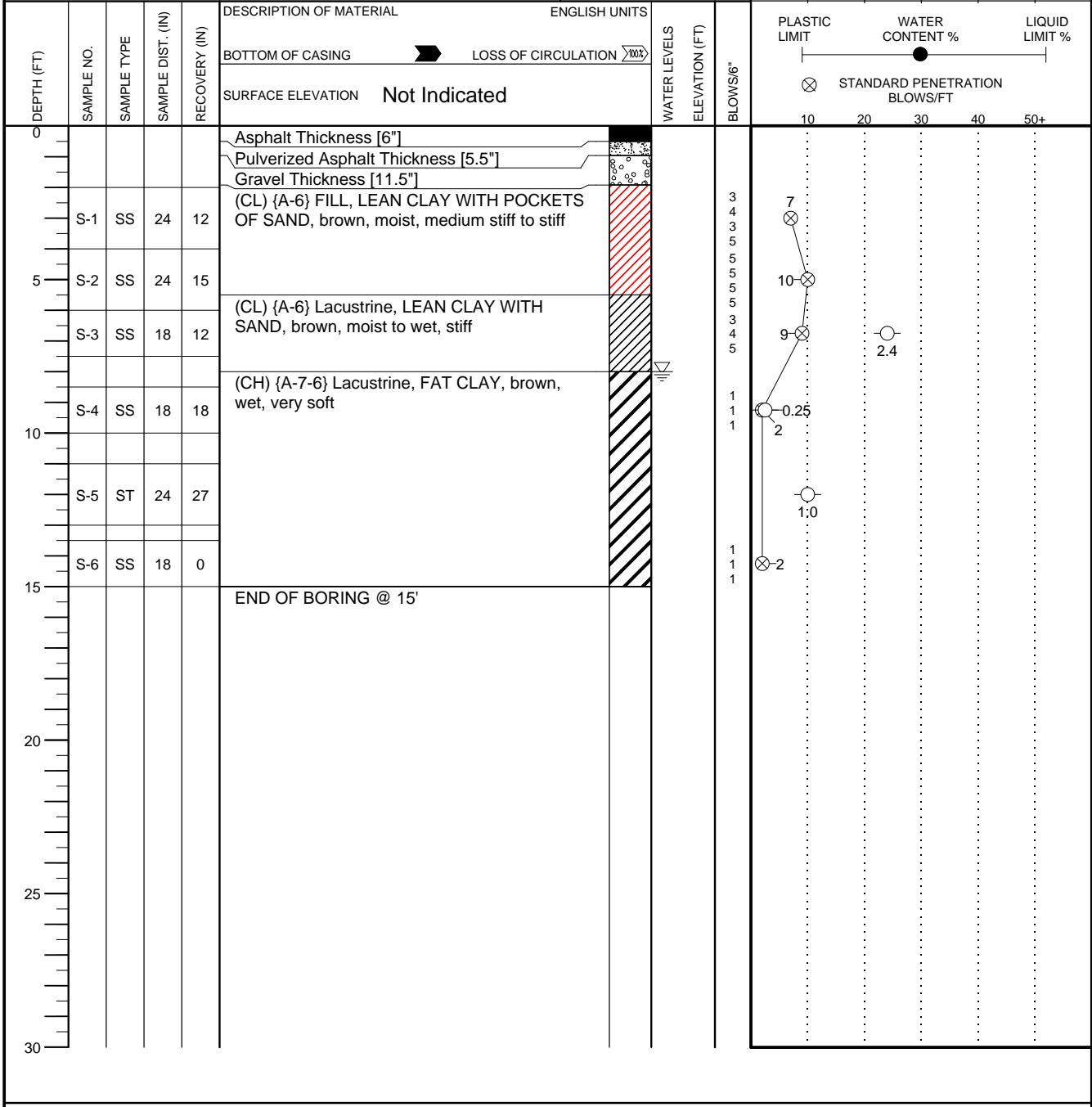


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/27/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 10' (AH)		

CLIENT City of De Pere	JOB # 1549	BORING # 7	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin	CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — — — — — REC.% — — — — — 20% 40% 60% 80% 100%
Additional info. James Street	Station+Offset



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL 8 feet <input type="checkbox"/> WS <input checked="" type="checkbox"/> WD	BORING STARTED 11/27/18	
<input checked="" type="checkbox"/> WL(BCR) <input checked="" type="checkbox"/> WL(ACR) None	BORING COMPLETED 11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL	RIG ATV FOREMAN GB/BB	DRILLING METHOD 3 1/4" HSA 0' to 15' (AH)

CLIENT City of De Pere	JOB # 1549	BORING # 8	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION
Various Streets, De Pere, Brown County, Wisconsin

Additional info. Station+Offset

Prosper Street

DESCRIPTION OF MATERIAL ENGLISH UNITS

BOTTOM OF CASING LOSS OF CIRCULATION >10%

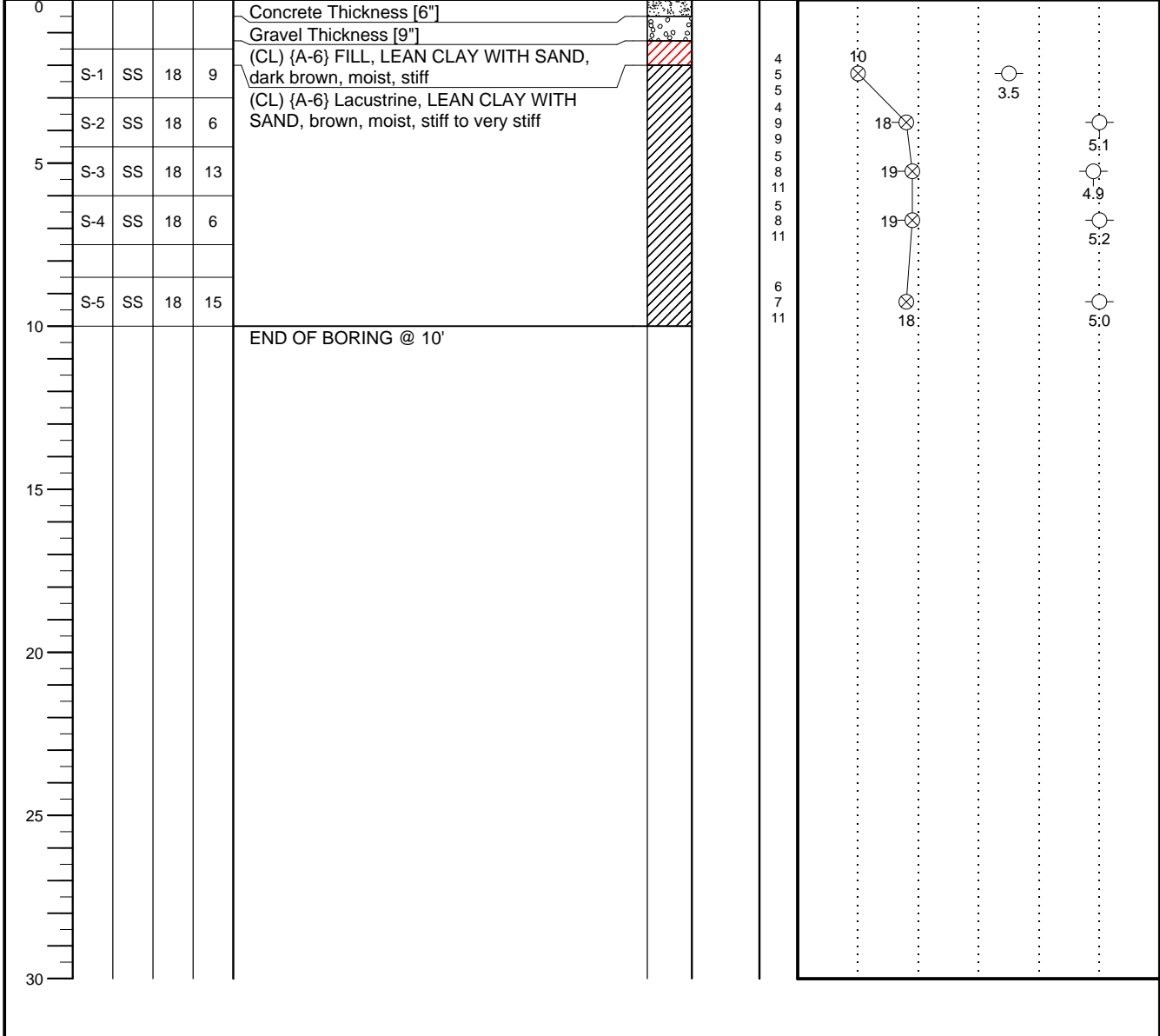
SURFACE ELEVATION **Not Indicated**

WATER LEVELS ELEVATION (FT) BLOWS/6"

ROCK QUALITY DESIGNATION & RECOVERY
RQD% REC.%
20% 40% 60% 80% 100%


PLASTIC LIMIT WATER CONTENT % LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT



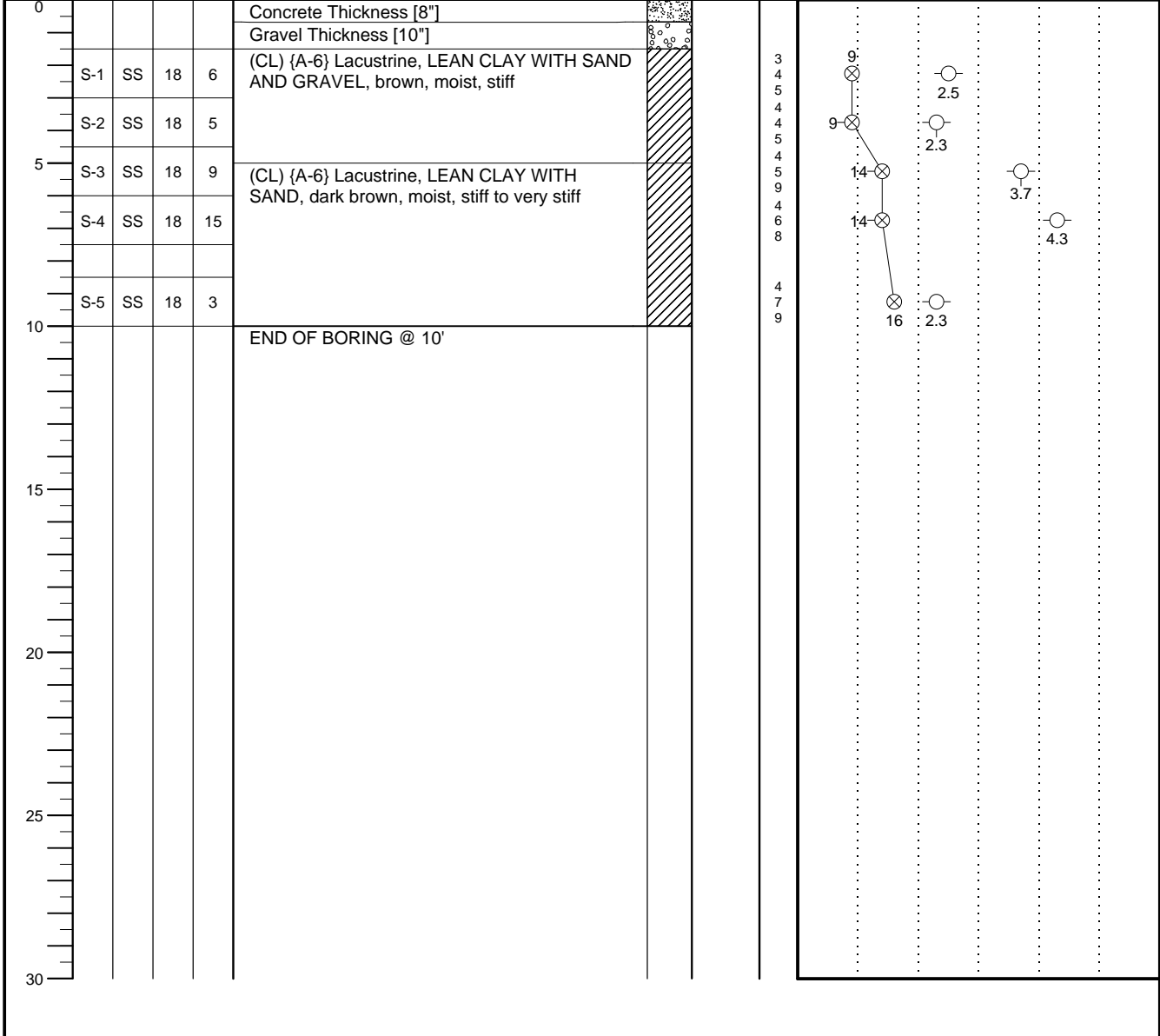
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None <input type="checkbox"/> WS <input checked="" type="checkbox"/> WD	BORING STARTED 11/27/18	
<input checked="" type="checkbox"/> WL(BCR) <input checked="" type="checkbox"/> WL(ACR) None	BORING COMPLETED 11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL	RIG ATV FOREMAN GB/BB	DRILLING METHOD 3 1/4" HSA 0' to 10' (AH)

CLIENT City of De Pere	JOB # 1549	BORING # 9	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin		CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — REC.% — 20% 40% 60% 80% 100%
Additional info.	Station+Offset	

Prosper Street					PLASTIC LIMIT — WATER CONTENT % — LIQUID LIMIT % STANDARD PENETRATION BLOWS/FT 10 20 30 40 50+
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	

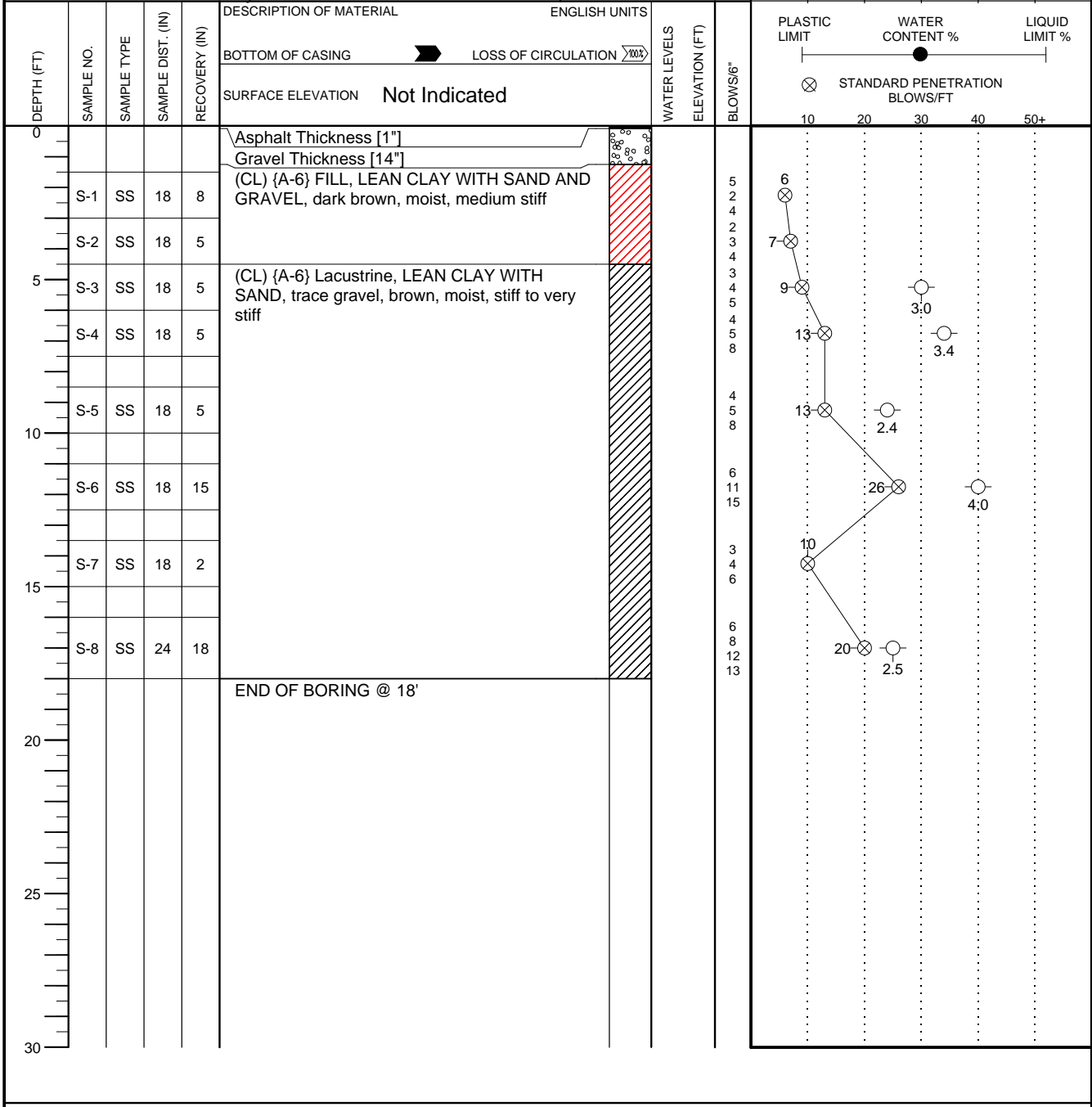


THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/27/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 10' (AH)		


CLIENT City of De Pere	JOB # 1549	BORING # 10	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION Various Streets, De Pere, Brown County, Wisconsin	Station+Offset	CALIBRATED PENETROMETER TONS/FT ² 1 2 3 4 5+ ROCK QUALITY DESIGNATION & RECOVERY RQD% — — — REC.% — — — 20% 40% 60% 80% 100%
Additional info. Ryan Road		PLASTIC LIMIT — — — WATER CONTENT % — — — LIQUID LIMIT % STANDARD PENETRATION BLOWS/FT 10 20 30 40 50+



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

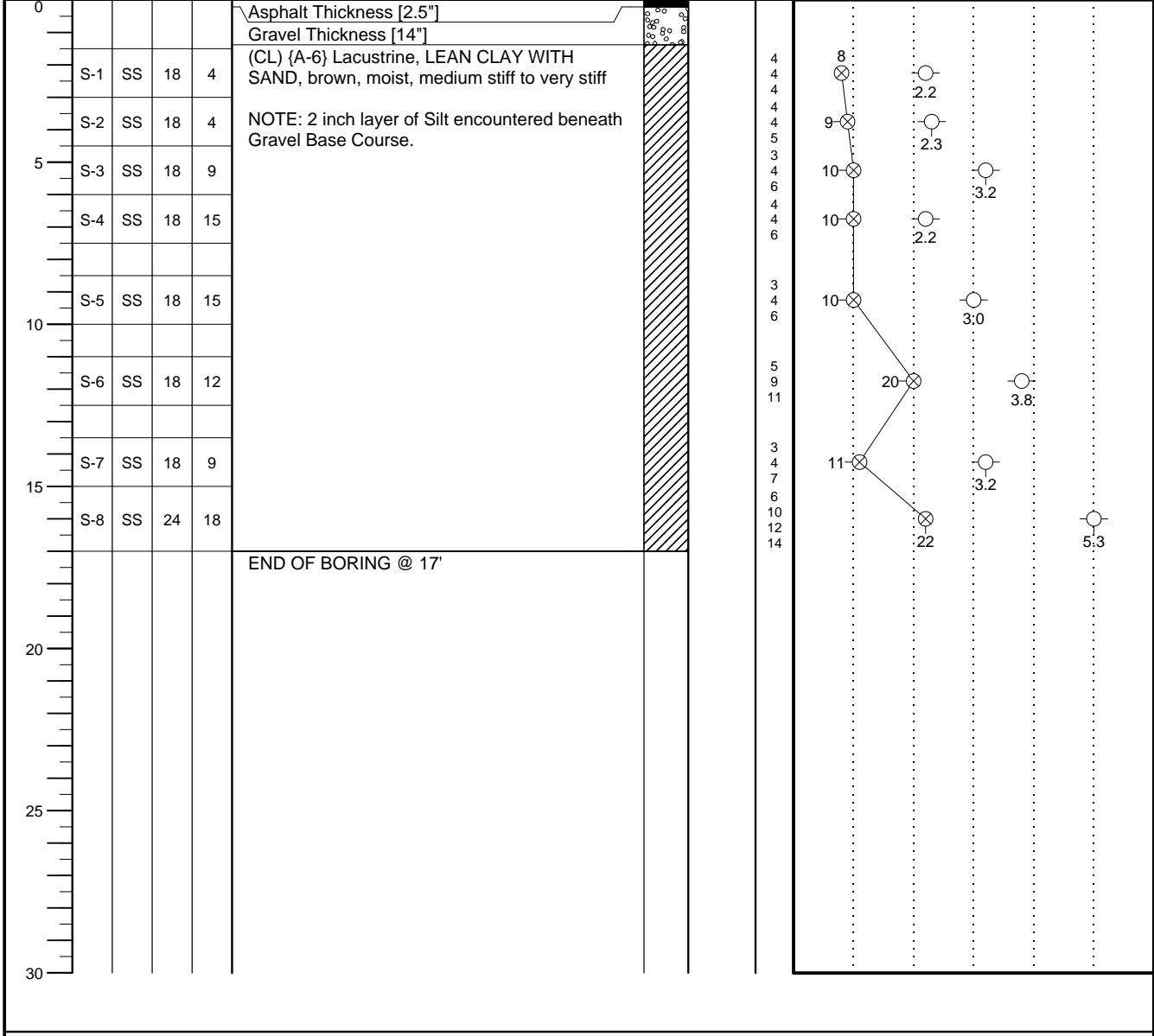
<input checked="" type="checkbox"/> WL None	<input type="checkbox"/> WS	<input checked="" type="checkbox"/> WD	BORING STARTED	11/27/18	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG	ATV	FOREMAN GB/BB
			DRILLING METHOD 3 1/4" HSA 0' to 18' (AH)		

CLIENT City of De Pere	JOB # 1549	BORING # 11	SHEET 1 OF 1	
PROJECT NAME 2019 Construction Design	ARCHITECT-ENGINEER			

SITE LOCATION
Various Streets, De Pere, Brown County, Wisconsin

Additional info. **Ryan Road** Station+Offset

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING LOSS OF CIRCULATION		
					SURFACE ELEVATION Not Indicated		



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

<input checked="" type="checkbox"/> WL None <input type="checkbox"/> WS <input checked="" type="checkbox"/> WD	BORING STARTED 11/27/18	
<input checked="" type="checkbox"/> WL(BCR) <input checked="" type="checkbox"/> WL(ACR) None	BORING COMPLETED 11/27/18	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL	RIG ATV FOREMAN GB/BB	DRILLING METHOD 3 1/4" HSA 0' to 17' (AH)



SOIL AND SITE EVALUATION – STORM

In accordance with SPS 382.365, 385, Wis. Adm. Code, and WDNR Standard 1002

Attach a complete site plan on paper not less than 8 ½ x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent of slope, scale or dimensions, north arrow, and BM referenced to nearest road <p style="text-align: center;">Please print all information</p> Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1)(m)]				County Brown	
				Parcel I.D. WD-L484	
				Reviewed by: M King / M Meyer Date: 12/3/18	
Property Owner R&M Garrity Farm, LLC ETAL			Property Location		
			Govt. Lot SW¼ SW¼ S6 T22 N R20 E		
Property Owner' Mail Address 3173 Trenton Lane			Lot #	Block #	Subd. Name or CSM # Garrity's Glen South
City Green Bay	State WI	Zip Code 54313-4025	Phone Number	<input checked="" type="checkbox"/> City De Pere	<input type="checkbox"/> Vill age
				<input type="checkbox"/> Town	Nearest Road Adare Court
Drainage area _____ <input type="checkbox"/> sq.ft <input type="checkbox"/> acres			Hydraulic Application Test Method		Soil Moisture Date of soil borings: _____
Test site suitable for (check all that apply): <input type="checkbox"/> Site not suitable;			<input checked="" type="checkbox"/> Morphological Evaluation		USDA-NRCS WETS Value:
<input type="checkbox"/> Bioretention; <input type="checkbox"/> Subsurface Dispersal System;			<input type="checkbox"/> Double Ring Infiltrometer		<input type="checkbox"/> Dry =1;
<input type="checkbox"/> Reuse; <input type="checkbox"/> Irrigation; <input type="checkbox"/> Other _____			<input type="checkbox"/> Other: (specify) _____		<input checked="" type="checkbox"/> Normal = 2;
					<input type="checkbox"/> Wet = 3.

3 #OBS. Pit Boring Ground surface elevation. --- ft. Elevation of limiting factor. --- ft.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr
A	0 – 8	7.5 YR 4/3	No Redox Features	c	0, cdy	fr	C	0 – 5	60 – 70	0.07
C	8 – 60	7.5 YR 4/4	No Redox Features	c	1, f, abk	fi	C	0 – 5	70 – 80	0.07
C	60 – 240	7.5 YR 4/3	No Redox Features	c	1, f, abk	fi	---	0 – 5	70 – 80	0.07

Comments:

4 #OBS. Pit Boring Ground surface elevation. --- ft. Elevation of limiting factor. 216 ft.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frags.	% Fines	Hydraulic App Rate Inches/Hr
---	0 – 8	7.5 YR 3/2	No Redox Features	c	0, cdy	fr	C	0 – 5	60 – 70	0.07
---	8 – 36	7.5 YR 4/4	No Redox Features	c	0, cdy	fr	C	0 – 5	70 – 80	0.07
C	36 – 240	7.5 YR 4/3	No Redox Features	c	1, f, abk	fi	---	0 – 5	70 – 80	0.07

Comments:

Name (Please Print) Matthew A. Meyer	Signature 	Credential Number 1053414
Address 1060 Breezewood Lane, Suite 102 Neenah, WI 54956	Date Evaluation Conducted 12/3/18	Telephone Number 920-886-1406

APPENDIX C – Supplemental Report Documents

Important Information about This Geotechnical-Engineering Report

Important Information about Your Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical-Engineering Report Is Based on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical-engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical-engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold-prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your GBA-Member Geotechnical Engineer for Additional Assistance

Membership in the GEOPROFESSIONAL BUSINESS ASSOCIATION exposes geotechnical engineers to a wide array of risk confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBA-member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

Copyright 2014 by Geoprofessional Business Association, Inc. (GBA). Duplication, reproduction, or copying of this document, in whole or in part, by any means whatsoever, is strictly prohibited, except with GBA's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of GBA, and only for purposes of scholarly research or book review. Only members of GBA may use this document as a complement to or as an element of a geotechnical-engineering report. Any other firm, individual, or other entity that so uses this document without being a GBA member could be committing negligent or intentional (fraudulent) misrepresentation.

APPENDIX B
GEOTECHNICAL ENGINEERING REPORT
FOR DE PERE PROJECT 20-01
BY ECS MIDWEST, LLC (11/22/2019)



ECS Midwest, LLC

Geotechnical Engineering Report

De Pere Project 20-01

Various Streets

De Pere, Brown County, Wisconsin

ECS Project Number 59:1669-A

November 22, 2019





November 22, 2019

Mr. Eric Rakers
City of De Pere
925 South Sixth Street
De Pere, WI 54115
Email: erakers@mail.de-pere.org

ECS Project No. 59:1669-A

Reference: Geotechnical Engineering Report
De Pere Project 20-01
Various Streets
De Pere, Brown County, Wisconsin

Mr. Rakers:

ECS Midwest, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the above-referenced project. We performed our services in general accordance with our Proposal No. 59:1290, dated December 20, 2018. This report presents our understanding of the geotechnical aspects of the project, the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to the City of De Pere on this project. We would appreciate the opportunity to continue our services during the remainder of design and provide our services during construction to verify the assumptions of subsurface conditions made for this report. Please contact us should you have any questions concerning the information contained in this report, or if we can be of further assistance to you.

Respectfully submitted,

ECS Midwest, LLC

Mark E. King, P.E.
Group Manager
mking@ecslimited.com



Alex E. Barker, P.E.
Office Manager
abarker@ecslimited.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	2
1.1 General	2
1.2 Scope of Services	2
1.3 Authorization.....	2
2.0 PROJECT INFORMATION	3
2.1 Project Location.....	3
2.2 Past Site History/Uses	3
2.3 Current Site Conditions	4
2.4 Proposed Construction.....	4
3.0 FIELD EXPLORATION	5
3.1 Field Exploration Program.....	5
3.1.1 Test Borings	5
3.2 Soil Survey Mapping.....	5
3.3 Subsurface Characterization	8
3.4 Groundwater Observations.....	9
4.0 LABORATORY TESTING.....	10
5.0 DESIGN RECOMMENDATIONS	11
5.1 Pavement Design considerations.....	11
5.2 Infiltration Design Considerations.....	13
6.0 SITE CONSTRUCTION RECOMMENDATIONS	15
6.1 Subgrade Preparation	15
6.1.1 Existing Utilities.....	15
6.1.2 Stripping and Initial Site Preparation.....	15
6.1.3 Special Subgrade Preparations – Utilities.....	15
6.1.4 Special Subgrade Preparations – Pavements	15
6.1.5 Proofrolling	17
6.1.6 Site Temporary Dewatering.....	17
6.1.7 Subgrade Stabilization	18
6.2 Earthwork Operations	18
6.2.1 Engineered Fill Materials	18
6.2.2 Compaction.....	19
6.3 Pavement Subgrade Observations.....	21
6.4 Utility Installations	21
6.5 General Construction Considerations	21
7.0 CLOSING.....	24

APPENDICES

Appendix A – Drawings & Reports

- Site Location Diagram
- Boring Location Diagram

Appendix B – Field Operations

- Reference Notes for Boring Logs
- Test Boring Log 1 through 7
- Soil And Site Evaluation - Storm

Appendix C – Supplemental Report Documents

- Important Information about This Geotechnical-Engineering Report

EXECUTIVE SUMMARY

The main findings of the exploration are briefly summarized below. Information gleaned from the executive summary should not be utilized in lieu of reading the entire geotechnical report.

- The geotechnical subsurface exploration performed at the sites included seven (7) standard penetration test borings. ECS drilled the borings to a depth of approximately 5 to 20 feet below the existing grade for a total of 65 feet.
- The borings generally encountered a topsoil or asphalt pavement section at the surface and then existing fill strata overlying a combination of glacial till and lacustrine soils, which extended to the termination depth of the borings. However, Boring 1, 5 and 7 did not contain existing fill strata. The encountered glacial till consisted of medium stiff to stiff lean clay (CL) and sandy lean clay (CL) soils, while the lacustrine soil consisted of medium stiff to very stiff silty clay (CL/ML), fat clay (CH), and lean clay (CL). Further, the existing FILL consisted of medium stiff to stiff organic silt (OL), lean clay (CL), and sandy lean clay (CL) soils.
- The drill crew observed the boreholes for a groundwater level during drilling and at the completion of drilling operations. However, none of the borings contained a groundwater level.
- ECS recommends the removal of all existing fill and organic soils from below utility structures and pipes.
- ECS anticipates Excavation Below Subgrade (EBS) will be performed where the encountered subgrade soils contain more than 5 percent organic content or proof-rolling operations indicate rutting or deflections in excess of 1 inch. Consideration should be given to providing EBS for frost concerns where the exposed subgrade contains highly frost susceptible soil (e.g. silt or silty clay).
- In our opinion, initial attempts to control groundwater seepage into excavations could include a series of sump pits and pumps. However, if the groundwater level cannot be controlled with a series of sump pumps, or where excavations extend below the static groundwater level, then dewatering efforts will require a more substantial system (such as temporary well point system).

1.0 INTRODUCTION

1.1 GENERAL

ECS prepared this report for the purpose of providing the results of our subsurface exploration and laboratory testing, site characterization, engineering analysis, and geotechnical opinions and recommendations concerning the potential suitability of the subject site for the design and construction of utility infrastructure, pavements, and storm water management systems. The report also includes our recommendations concerning geotechnical subgrade preparation, fill placement, dewatering and construction considerations.

1.2 SCOPE OF SERVICES

ECS performed seven (7) standard penetration test borings at the approximate locations shown on the Soil Bore Location maps dated September 2019, which were prepared by the City of De Pere. We also implemented a limited laboratory-testing program to characterize the physical and engineering properties of the subsurface soils.

This report discusses our exploration and testing procedures, presents our findings and evaluations, and includes the following.

- A brief description of our field and laboratory test procedures and results.
- A description of the observed surface topographical features and site conditions.
- A description of area and site geologic conditions.
- A description of the interpreted subsurface soil stratigraphy with pertinent available physical properties.
- Copies of our records of subsurface exploration (test boring logs).
- Recommendations for design of pavements (rigid and flexible) including subgrade preparation, soil parameters for WisDOT pavement design and pavement drainage.
- Recommendations for storm water infiltration.
- Utility construction considerations.
- Recommendations for site preparation and construction of engineered fills, including an evaluation of on-site soils for use as compacted fills, and delineation of potentially unsuitable soils.
- Evaluation and recommendations relative to groundwater control.

1.3 AUTHORIZATION

ECS provided services in accordance with our Proposal No. 59:1290, (dated December 20, 2018) and the "Agreement for Consulting Services – City of De Pere" authorized by Mr. Michael Walsh, Mayor and Ms. Shana Ledvina, Clerk-Treasurer (dated February 18, 2019), and includes the Terms and Conditions of Service outlined in the Proposal and Agreement.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION

The project sites are located in the City of De Pere, Brown County, Wisconsin. Specifically, the project sites are located at the following locations:

- East Matthew Drive Storm Ponds (Boring 1 and 2) located at the southeast corner of the intersection of East Matthew Drive and Suburban Drive.
- Cass Street (Boring 3) at the west cul de sac of the street.
- Alley (Boring 4) north of George Street, between Ontario Street and Winnebago Street.
- South 8th Street (Boring 5) between Main Avenue and Reid Street.
- Reid Street (Boring 6) between South 8th Street and Allard Street.
- Patriot Way (Boring 7) at its intersection with Patrick Henry Avenue.

The site location is shown in Figure 2.1.1 and on the Site Location Diagram in Appendix A of this report.



Figure 2.1.1 Site Locations (approximately outlined in red)

2.2 PAST SITE HISTORY/USES

ECS reviewed aerial photographs of the subject site dated 1992, 2005, 2006, 2008, 2010, 2011, 2015, 2017 and 2018. Based on our review of the aerial photographs, the site use at the East Matthew Drive Storm Ponds appeared to consist of vacant land used for storm water management. Further, the site use at Cass Street, Alley, South 8th Street, Reid Street, and Patriot Way appeared to consist of asphalt paved urban street sections. These site uses appeared to have remained relatively unchanged since at least 1992.

2.3 CURRENT SITE CONDITIONS

The site of the proposed construction consisted of groomed lawn and existing storm water pond at the East Matthew Drive Storm Ponds and an asphalt paved urban street section at Cass Street, Alley, South 8th Street, Reid Street, and Patriot Way at the time of drilling. The ground surface generally consisted of nearly level to gently sloping soils across the sites. However, ECS did not determine the surface elevation at the boring locations.

2.4 PROPOSED CONSTRUCTION

ECS understands the proposed project will include reconstruction of existing municipal utilities, roadway pavements, and storm water management devices. Further, we anticipate the proposed pavements will consist of a concrete or bituminous pavement section, and the new vertical and horizontal alignments will approximately match the existing alignments (less than 2 feet of elevation change). The planned traffic volume was not provided to us at the time of this report. ***If the design changes, please notify ECS immediately so that we evaluate our recommendations and verify the recommendations are appropriate for the proposed construction.***

Where the borings encounter subsurface conditions that might be detrimental to the support of the proposed construction, ECS has assumed the owner will have an acceptable risk level if the detrimental material remains in place. With this in mind, this report assumes the owner would only be willing to accept a low risk for utility settlement in excess of 1 inch. In addition, we assume the owner would be willing to accept a moderate risk for reduced pavement performance. ***If these assumptions concerning the owner's acceptable risk level are incorrect, we should be immediately contacted so we can review our recommendations in light of the changed acceptable risk level.***

3.0 FIELD EXPLORATION

3.1 FIELD EXPLORATION PROGRAM

ECS used the boring depths and locations provided by Mr. Bob Krzewina of the City of De Pere, to characterize the project site in general geotechnical and geological terms, and to evaluate subsequent field and laboratory data to assist in the determination of geotechnical recommendations.

3.1.1 Test Borings

ECS drilled seven (7) standard penetration test borings within the limits of the proposed construction. The drill crew advanced four (4) of the borings to a depth of approximately 5 feet, one (1) to 10 feet, one (1) to 15 feet, and one (1) to 20 feet below the existing grade. We performed the borings with a truck vehicle mounted rotary drill rig utilizing continuous flight hollow stem augers (HSA).

City of De Pere personnel staked the test boring locations in the field. The approximate as-drilled test boring locations are shown on the Boring Location Diagram in Appendix A of this report. Please note, the drill crew offset Boring 1, 2, 3 and 5 from the marked locations because of conflicts with existing utilities or drill rig access concerns. The distance and direction of the offsets are noted on the boring logs in Appendix B of this report. However, our scope did not include obtaining the surface elevation at the boring locations.

The drill crew conducted standard penetration tests (SPTs) in the boreholes at regular intervals in general accordance with American Society for Testing Materials (ASTM) D1586 and American Association of State Highway and Transportation Officials (AASHTO) T206. The obtained standard penetration resistances provide a general indication of soil relative density and consistency. The drill crew chief visually and manually classified the samples in the field using ASTM D2488 as a guide. Field personnel then collected representative soil samples and returned them to the laboratory for further observation and verification of the field classification.

Some borehole backfill settlement or expansion can and will occur over time. Monitoring the boreholes after the initial drilling activities is not within our scope. Settlement or expansion of the borehole backfill can create a hazard and should be carefully monitored by the client.

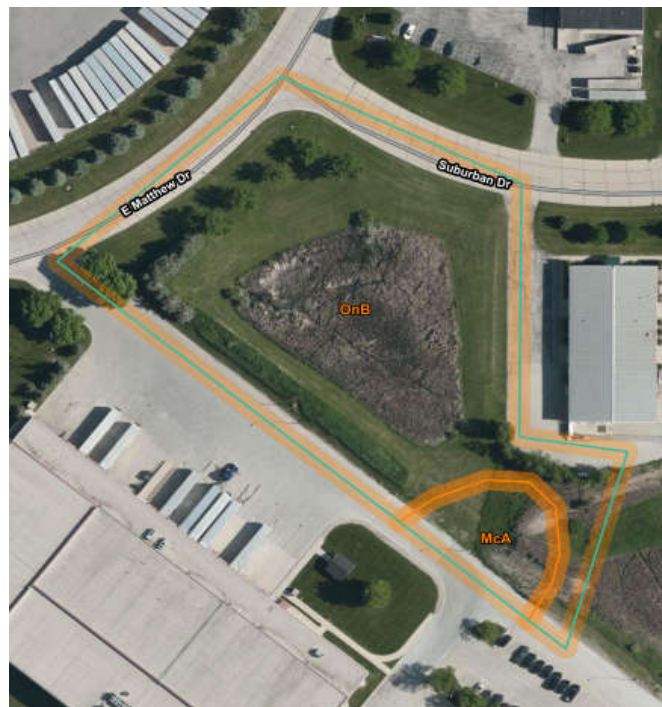
3.2 SOIL SURVEY MAPPING

According to the Soil Survey from the USDA - Natural Resources Conservation Service (websoilsurvey.nrcs.usda.gov), which provides soil information to a shallow depth (generally less than 5 feet), the site soils are generally mapped as Fill land (Fd), Manawa silty clay loam (McA), Oshkosh sandy loam (OmB), and Oshkosh silt loam (OnB). These soil types are described with the following properties.

- Fill land (Fd) – Landforms consisting of human transported materials of various soil types. These soils are generally well drained and have a moderate potential for frost action. This soil type is mapped in the area of Boring 3.

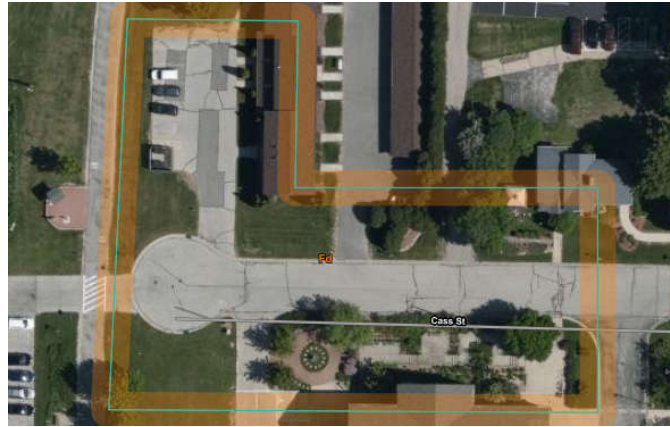
- Manawa silty clay loam (McA) – Landforms consisting of drainageways with clayey till, and/or calcareous, dense clayey till. These soils are generally somewhat poorly drained, classified as being in Hydrologic Soil Group D, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 2.
- Oshkosh sandy loam (OmB) – Landforms consisting of glacial lakes with silty loess over clayey lacustrine deposits. These soils are generally well drained, classified as being in Hydrologic Soil Group C, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 5 and 6.
- Oshkosh silt loam (OnB) – Landforms consisting of glacial lakes with silty loess over clayey lacustrine deposits. These soils are generally well drained, classified as being in Hydrologic Soil Group C, and have a moderate potential for frost action. This soil type is mapped in the area of Boring 1, 4 and 7.

Soil mapping of the site vicinity is presented in the following figures.



(Source: USDA - Natural Resources Conservation Service)

Figure 3.2.1 Soil Survey Information (East Matthew Drive Storm Ponds)



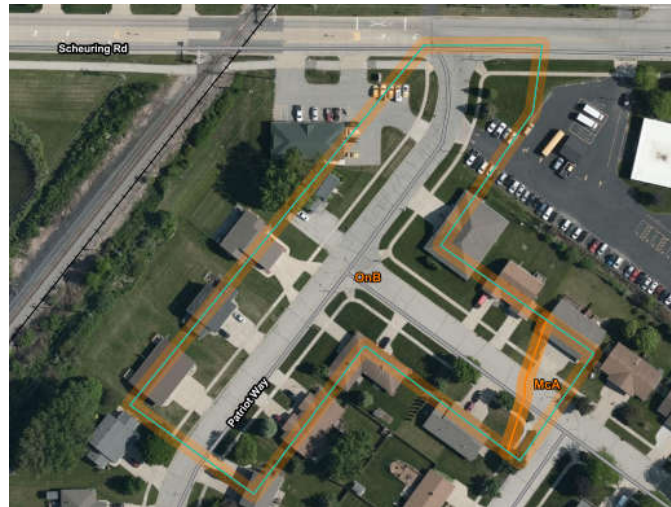
(Source: USDA - Natural Resources Conservation Service)
Figure 3.2.2 Soil Survey Information (Cass Street)



(Source: USDA - Natural Resources Conservation Service)
Figure 3.2.3 Soil Survey Information (Alley)



(Source: USDA - Natural Resources Conservation Service)
Figure 3.2.4 Soil Survey Information (South 8th Street and Reid Street)



(Source: USDA - Natural Resources Conservation Service)

Figure 3.2.5 Soil Survey Information (Patriot Way)

3.3 SUBSURFACE CHARACTERIZATION

The encountered subsurface conditions in the borings appeared to closely match published geological mapping, with the exception of the existing fill in Boring 2, 4 and 6. Table 3.3.1 of this report provides a generalized characterization of the soil strata encountered at the boring locations during our subsurface exploration. For subsurface information at a specific test boring location, refer to the boring logs in Appendix B of this report.

Table 3.3.1 Subsurface Stratigraphy

Approximate Depth Range (feet)	Strata	Description	SPT ⁽¹⁾ N-value Range (bpf)	Unconfined Compressive Strength ⁽²⁾ (tsf)
Surface	--	Approximately 2 to 3 inch thick topsoil layer at Boring 1 through 3, and 12 to 17 inch thick asphalt pavement section at Boring 4 through 7.	N/A	N/A
2 - 4	I	FILL: medium stiff to stiff organic silt (OL), lean clay (CL), and sandy lean clay (CL) (Boring 2, 3, 4 and 6)	6 - 13	N/A
5 - 20 (End of Boring)	II	Glacial Till and/or Lacustrine: medium stiff to very stiff silty clay (CL/ML), sandy lean clay (CL), lean clay (CL) and fat clay (CH)	6 - 23	1.0 - 5.2

Notes: (1) Standard Penetration Test.
 (2) Based on calibrated hand penetrometer test

Where the drill crew used discontinuous material sampling intervals at the test borings, ECS inferred conditions between sample intervals. The soil stratification shown on the boring logs represents the interpreted soil conditions at the actual boring locations. Variations in the stratification can occur between sample intervals and boring locations. The subsurface conditions at other times and locations on the site may differ from those found at the boring locations. If different site conditions are encountered during construction, ECS should be contacted to review our recommendations relative to the new information.

The soil classifications noted on the boring logs may not be representative of the entire soil matrix because of the limitations of the split-spoon sampler, which has a 1 $\frac{3}{8}$ -inch inside diameter. Materials larger than the 1 $\frac{3}{8}$ -inch inside diameter of the split-spoon sampler cannot be collected and observed directly. Where possible, the drill crew noted on the boring logs the estimated depth of larger diameter materials, such as cobbles, based on things such as changes in the observed drilling resistance and auger cuttings.

3.4 GROUNDWATER OBSERVATIONS

The drill crew observed the bore holes for a measureable groundwater level during and at the completion of drilling operations. However, none of the borings contained a groundwater level.

The borings generally encountered soils with poor draining characteristics. With this in mind, in our opinion, the lack of an observed groundwater level in the borings may not necessarily indicate a static groundwater level below the termination depth of the boring at the time of this exploration program. In addition, variations in the long-term water table elevation may occur as a result of seasonal variations in precipitation, evaporation, surface water runoff, lateral drainage conditions, construction activities, and other factors. The time of year and the weather history during the advancement of the borings should be considered when estimating groundwater levels at other points in time.

4.0 LABORATORY TESTING

The following paragraphs briefly describe the results of the completed laboratory testing program. We performed classification and index property tests on representative soil samples obtained from the test borings to aid classification of the soils, and to help estimate engineering properties.

A geotechnical engineer visually classified each collected soil sample from the test borings on the basis of texture and plasticity using the Unified Soil Classification System (USCS) and ASTM D2488 (AASHTO T206), Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) as a general guideline. After classification, the geotechnical engineer grouped the various soil types into the major zones noted on the test boring logs in Appendix B of this report. The group symbols for each soil type are indicated in parentheses before the soil descriptions on the test boring logs. The bracketed text noted on the boring logs after the group symbols indicates the AASHTO Classification. The stratification lines designating the interfaces between earth materials on the test boring logs are approximate; in-situ, the transitions may be gradual.

The soils retained from Boring 1 and 2 were also classified using the U.S. Department of Agriculture (USDA) Soil Classification System. The USDA classifications can be found on the "Soil and Site Evaluation – Storm" form included in Appendix B of this report.

ECS performed calibrated hand penetrometer tests (Q_p) on select cohesive soil samples. In the hand penetrometer test, the unconfined compressive strength of a soil sample is estimated, to a maximum of 6.0 tons per square foot (tsf), by measuring the resistance of a soil sample to penetration by a small, calibrated, spring-loaded cylinder. The hand penetrometer test results can be found on the boring logs.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposal.

5.0 DESIGN RECOMMENDATIONS

5.1 PAVEMENT DESIGN CONSIDERATIONS

Subgrade Characteristics: The pavement design recommendations assume the subgrade consists of suitable materials evaluated by ECS, and the subgrade is prepared as recommended in the Subgrade Preparation and Earthwork Operations sections of this report.

Based on the results of our soil borings, ECS recommends the use of the pavement subgrade design parameters noted in Table 5.1.1 of this report, which provides values for the first suitable soil strata encountered in the borings. ECS obtained the values for the Soil Support Value and Design Group Index from the WisDOT Pavement Design Manual and Frost Index values from the frost susceptibility classifications according to the U.S. Army Corps of Engineer's criteria. We estimated the Subgrade and Resilient Modulus values based on historical testing of similar soil.

For grading work and drainage design, shrinkage should be in the range of 20 to 35 percent for the encountered soils. These values correlate to expansion factors of 25 to 54 percent. For design purposes we recommend using an average shrinkage factor of 25 percent (33 percent expansion factor).

Table 5.1.1 Recommended Pavement Subgrade Design Parameters^{1, 2}

Boring Number	Location ³	Soil Classification		Subgrade Reaction Modulus, K (psi/in)	Resilient Modulus, M _R (psi)	Frost Index	Soil Support Value	Design Group Index
		USCS	AASHTO					
1	East Matthew Storm Pond	CH	A-7-6	100	2,600	F-3	3.8	15
2	East Matthew Storm Pond	CL [FILL] ⁴	A-6	125	2,800	F-3	4.2	12
3	Cass Street	CL	A-6	150	3,000	F-3	4.2	12
4	Alley	CL [FILL] ⁴	A-6	125	2,800	F-3	4.2	12
5	South 8 th Street	CL	A-6	150	3,000	F-3	4.2	12
6	Reid Street	CL	A-6	150	3,000	F-3	4.2	12
7	Patriot Way	CL	A-6	150	3,000	F-3	4.2	12

- Notes:
1. All design parameters are estimates only, and are based on historical data for similar soil types. If more accurate values are required, additional testing should be performed.
 2. Design parameters are for the first suitable soil strata below the proposed pavement elevation encountered in the borings. If more than 2 feet of sub-base fill material is placed, the characteristics of the fill will govern the pavement design.
 3. General boring locations determined by City of De Pere personnel.
 4. Denotes existing fill which, understanding the risks noted in the Subgrade Preparation section of this report, is suitable to support the proposed pavement section.

Areas of subgrade stabilization and/or undercut may be needed because of the potentially variable support of the existing fill, especially if the subgrade is subjected to construction traffic disturbance or if construction is during adverse weather conditions. A reduced service life, increased pavement maintenance and associated costs should be expected because of the existing fill subgrade. In addition, consideration should be given to providing Excavation Below Subgrade (EBS) for frost

concerns in areas where the exposed subgrade contains highly frost susceptible soil (e.g. silt or silty clay).

The ends of over-excavated areas should be sloped across a minimum length of 10 feet to reduce the potential abrupt changes in the pavement support characteristics that could lead to future pavement distress. Furthermore, in areas requiring over-excavation for detrimental frost concerns and in trenches for utilities, ECS recommends constructing transition zones, which are wedges of backfilled soil used to mask the distinct difference between the native soils and the backfilled area (such as trenches for utilities). The transition zone should start at the trench walls, and a depth of 3 feet below the finished pavement, and rise at a slope of 1 vertical to 3 horizontal as it extends perpendicular to the trench. However, transition zones would not be necessary where EBS areas are backfilled with soils similar to the native soils, or where the native soils contain less than 30 percent material passing the #200 sieve.

Prior to placing the aggregate base material, the pavement subgrade should be prepared as recommended within this report. Crushed aggregate base course utilized below pavements should meet Section 305 of the WisDOT Standard Specifications for Road and Bridge Construction and the gradation should meet the "1¼ inch" specification. The crushed aggregate base course should be compacted to at least 95 percent of the maximum dry density obtained in accordance with ASTM D1557, Modified Proctor method. As an alternative, a dense graded base meeting the "3 inch" specification can be used for the lower 8 inches of the base course layer to bridge over softer subgrade soils.

The aggregate used in the bituminous mixture should meet the 19.0 mm gradation for the lower pavement layer and the 12.5 mm gradation for the upper pavement layer as specified in Section 460 of the WisDOT Standard Specifications for Road and Bridge Construction. The asphalt pavement should be compacted to a minimum of 93 percent of the theoretical density value.

Adequate construction joints, contraction joints and isolation joints should be provided in the areas of rigid pavement to reduce the impacts of cracking and shrinkage. Please refer to ACI 325.12R-02 *Guide for Design of Jointed Concrete Pavements for Streets and Local Roads (Reapproved 2013)*. The Guide recommends an appropriate spacing strategy for the anticipated loads and pavement thickness. It has been our experience that joint spacing closer to the minimum values results in a pavement with less cracking and better long-term performance.

Weather Restrictions: In this region, asphalt plants may close during the months of December through March, and/or April if particularly cold weather conditions prevail. However, this can change based on year to year temperature fluctuations. Daily temperatures from December to March will often stay below 40°F, limiting the days that asphalt placement can occur.

Pavement Drainage: An important consideration with the design and construction of pavements is surface and subsurface drainage. Where standing water develops, either on the pavement surface or within the base course layer, softening of the subgrade and other problems related to the deterioration of the pavement can be expected. The final pavement surface should be shaped or crowned to properly direct surface water to suitable on or off-site storm water drainage infrastructure. In addition, the clayey pavement subgrade should be properly sloped to avoid dips or pockets where water may become trapped. Dips in the clayey subgrade could result in a

“bathtub” effect, which may trap water and potentially soften the subgrade. Good drainage should help reduce the possibility of the subgrade materials becoming saturated over a long period of time.

Infiltration and subterranean water are generally the main sources of water that should be considered in the design of the pavement. Based on the lack of an observed groundwater level in the borings, we consider surface water infiltration through the pavement joints, pores or cracks in the pavement, and through shoulders and areas adjacent to pavements to be the main source of water to be considered for pavement design on this project. To reduce the potential for shallow perched water to develop in areas of the site, “stub” or “finger” drains should be considered around catch basins and in other low-lying areas to reduce the accumulation of water above and within the subgrade soils and aggregate base. As an alternative to the use of stub or finger drains, existing manholes and storm sewer inlets could be perforated with 1-inch diameter holes at 2-foot centers, and the manhole/inlet wrapped with non-woven geotextile to reduce migration of material into the manhole/inlet. The holes could be placed at 90 degree intervals around the perimeter of the manhole, and the excavation around the manhole backfilled with free draining granular materials.

Sheet drainage across large pavement areas allows more water to enter the pavement through openings, cracks and weak points over time, which can adversely affect the base course and subgrade. This can increase the potential risk of premature pavement deterioration, distress and long-term pavement maintenance issues. Intermediate drains should be installed at adequate intervals to reduce the length of sheet flow across the pavement surface.

Pavement Maintenance: A sound maintenance program should be implemented to help maintain and enhance the performance of pavements, and help attain the design service life. A preventative maintenance program should be implemented early in the pavement life to be effective. The “standard in the industry” supported by research indicates that preventative maintenance should typically begin within 2 to 5 years of the placement of pavement. However, maintenance of pavement on undocumented fill sites may require more maintenance and sooner. Failure to perform preventative maintenance will reduce the service life of the pavement, and increase the costs for corrective maintenance and full pavement rehabilitation. To help reduce water infiltration thru the pavement section into the base course layer, which may result in softening of the subgrade and deterioration of the pavement, we recommend timely sealing of pavement joints and cracks with elastomeric caulk. We recommend exterior pavements be observed for distresses, such as cracks, depressions and poor drainage, at least twice a year, typically once in the spring and fall.

5.2 INFILTRATION DESIGN CONSIDERATIONS

The recommendations presented in this section follow the general guidelines of WDNR Conservation Practice Standard 1002, Site Evaluation for Stormwater Infiltration.

ECS understands a storm water management device would likely be constructed in the area of Boring 1 and 2. The "Soil and Site Evaluation – Storm" log included in Appendix B of this report indicates the storm water design parameters for each soil strata encountered in these borings. We determined the design infiltration rate using Table 2 of the Wisconsin Department of Natural Resources Conservation Practice Standards "Site Evaluation for Storm Water Infiltration (1002)".

Design Infiltration Rates: Based on the results of the exploration, the borings encountered soils that have a USDA soil classification of clay (c). Based on the soil textural classification and the

guidelines provided in Table 2 of the WDNR Conservation Practice Standard 1002, the infiltration rate of the clay soils encountered in the borings is 0.07 inches per hour. The soil infiltration rate for each soil strata encountered in the borings can be found on the ***Soil and Site Evaluation – Storm*** form included in Appendix B of this report. Infiltration rates based on soil textural classification and the guidelines provided in Table 2 of the WDNR Conservation Practice Standard 1002 should be adjusted for the least permeable soil layer within 5-feet of each of the listed intervals.

Estimation of the final design infiltration rate should consider the effects of any engineered fill placed, surface vegetation, erosion control devices, and potential groundwater mounding. Prior to and during construction, the design infiltration rate of the soil at the basin bottom should be verified. Compaction of the basin bottom subgrade during and following construction should be prevented as this may reduce the infiltration rate of the soil. This may require exclusion of construction traffic from the infiltration bottom, or loosening of the subgrade soil, such as by raking or discing. Sediment allowed to accumulate at the basin bottom will reduce infiltration. Measures should be taken to reduce accumulation of sediment. Periodic removal of sediment should be expected.

Infiltration Feasibility: Based on the conditions encountered in the test borings, the site is considered to have a low capacity for the infiltration of storm water because of the predominant clayey soils encountered at the test boring locations. In accordance with Section V, Step C5 of the Wisconsin Department of Natural Resources (WDNR) Conservation Practice Standard 1002, the clayey soils have a correlated infiltration rate of 0.07 inches per hour, which is less than 0.6 inches per hour, and as such, these soils are anticipated to be exempt from the infiltration requirements per section NR 151.12(5)(c)6.a of the Wisconsin Administrative Code.

Our scope of services is not inclusive of all steps involved in the initial site screening (Part A) of the WDNR Technical Standard 1002. Therefore, other conditions may exist at, or near the site that could exclude or exempt the site, or portions of the site from the infiltration requirements. Additional evaluation must be conducted prior to the design and implementation of an infiltration device at this site so that its construction meets Wisconsin Administrative Code requirements.

Details of the proposed storm water management device were not provided to ECS at the time of this report preparation; it is recommended ECS be provided the storm water management plans, when available, to check that the recommendations provided herein are applicable. ECS should also be called on to provide observation and testing during infiltration basin construction.

6.0 SITE CONSTRUCTION RECOMMENDATIONS

6.1 SUBGRADE PREPARATION

6.1.1 Existing Utilities

ECS recommends utilities not reused should be capped-off and removed or properly abandoned in-place in accordance with local codes and ordinances. The excavations for utilities to be removed in the influence zone of new construction are recommended to be backfilled with engineered fill. Grading operations must be done carefully so that existing utilities are not damaged or disturbed. Utility invert elevations, depths and sizes should be checked relative to the planned utility and pavement elevations to determine what specific concerns are present.

6.1.2 Stripping and Initial Site Preparation

The subgrade preparation should consist of stripping all pavement to be removed, organic soils (topsoil) and any other soft or unsuitable materials from the 5-foot expanded pavement limits and 5 feet beyond the toe of engineered fills, where feasible. ECS should be called on to observe and document that topsoil and other unsuitable surficial materials have been removed prior to the placement of engineered fill or construction of structures. Please note, topsoil removal should not be based on soil coloration alone. After removal of the root mat, it may be possible to leave some darker soils in place provided the soil contains no more than 5 percent organic matter as determined by ASTM D2974, has the recommended strength characteristics and is stable under proofroll. A landscape architect should approve any topsoil or other materials proposed for use in future landscape areas.

6.1.3 Special Subgrade Preparations – Utilities

The existing fill encountered in Boring 2, 3, 4 and 6 present a concern for the support of utility pipes and structures. The existing fill extended to a depth of between 2 and 4 feet below the existing grade. We anticipate the utilities will likely extend below the encountered fill depths. However, deeper existing fill could be encountered during construction, so the owner should be aware of an increased risk of settlement in excess of 1 inch associated with the construction of utilities on these soils. In our opinion, the risk would be high for utilities constructed on undocumented fill. Based on the anticipated acceptable risk level of the owner, ECS recommends the removal of all existing fill from below utility pipes and structures.

Excavations subcut below the proposed pipe or structure elevation should be oversized one foot horizontally in each direction for every foot of sub-base fill placed below the pipe or structure, to a maximum oversize of 3 feet on each side of the pipe. All over-excavated soils should be replaced with properly compacted engineered fill.

6.1.4 Special Subgrade Preparations – Pavements

In general, pavements derive their strength from the characteristics of the subgrade soils, the sub-base fill and the base course, and the concrete or bituminous upper layer and lower layer mixtures. In the design of the pavement, the total pavement thickness typically includes the concrete or bituminous mixtures, base course, and sub-base fill. The site has generally suitable

conditions for the proposed pavement construction. However, the existing fill and frost susceptible soils encountered in the borings present concerns for the pavement performance.

Existing Fill: The existing fill encountered in Boring 2, 3, 4 and 6 extended to a depth of between 2 and 4 feet below the existing grade. Existing fill provides a concern for the performance of the pavement system. The owner should be aware of the increased risk for a reduced pavement performance associated with constructing pavements on undocumented fill. The risk exists because undocumented fill has a higher potential for variable density. In addition, this risk tends to increase with the presence of organic soils (more than 5 percent organic content). However, because of natural soil variability, every construction site has at least a very low risk for a reduced pavement performance.

Based primarily on the standard penetration N-values, in ECS's opinion, the risk for reduced pavement performance associated with the existing fill at this site would generally be moderate to high. However, the risk could be reduced to a low risk where the existing fill contains less than 5 percent organic content *and* proof-rolling observations do not indicate rutting or deflection greater than 1 inch. Based on our assumption of the owner's acceptable level of risk, we recommend removing all existing fill which contains greater than 5 percent organic content, or does not meet the above proof-rolling requirements, from within 2 feet of the finished pavement grade. The removed material should then be replaced with a compacted engineered fill in accordance with the **Earthwork Operations** section of this report.

Frost Susceptible Soils: The frost susceptible clayey and silty soils encountered in the borings provide another concern for the pavement system. ECS wishes to note, a risk for reduced pavement performance exists with the construction of pavements on frost susceptible soil. The reduced pavement performance may occur because of potential detrimental frost heaving and spring thaw weakening. The risk associated with frost susceptible soils can be reduced by removal of all frost susceptible soils within 3 feet of the finished pavement grade. In our opinion, the risk at this site related to the frost susceptible soils would generally be moderate. However, the risk would be high to very high in areas where highly frost susceptible silt or silty clay soil is present within 3 feet of the finished pavement grade.

Summary: Based on our assumption of the owner's acceptable risk level (as outlined in the "Project Information" section of this report), we recommend the following:

1. Remove all existing fill soils from within 2 feet of the finished pavement grade, unless it contains less than 5 percent organic content *and* proof-rolling observations do not indicate rutting or deflection greater than 1 inch.
2. All over-excavated material should be replaced with compacted engineered fill in accordance with the **Earthwork Operations** section of this report.
3. If the owner is willing to accept a moderate risk for reduced pavement performance, then we anticipate a majority of the frost susceptible soils that have adequate strength will remain in place below pavements. However, we recommend removing all highly frost susceptible soils (e.g. silt and silty clay) from within 3 feet of the finished pavement grade.

6.1.5 Proofrolling

After the removal of all unsuitable surface materials, cutting to the proposed subgrade, and prior to the placement of any engineered fill or other construction materials, the exposed subgrade should be observed by ECS. The contractor should thoroughly proofroll the exposed subgrade with previously approved construction equipment having a minimum axle load of 9 tons (e.g. fully loaded tandem-axle dump truck in clayey soils or large smooth drum roller in sandy soils). The contractor should traverse the areas subject to proofrolling by the equipment in two perpendicular (orthogonal) directions with overlapping passes of the vehicle under the observation of ECS. This procedure is intended to assist in identifying any localized yielding materials. Unstable or pumping subgrade areas identified during the proofroll should be marked for repair prior to the placement of any subsequent engineered fill or other construction materials. Unstable subgrade repair methods, such as undercutting or moisture conditioning or chemical stabilization, should be discussed with ECS to determine the appropriate procedure(s) with regard to the existing conditions causing the instability. A test pit(s) may be excavated to explore the shallow subsurface materials in the area of the instability to aid in determining the cause of the observed unstable materials and to assist in the evaluation of the appropriate remedial action to stabilize the subgrade.

Near surface subgrade soils having a high moisture content and/or those having N-values less than 10 bpf may not pass a proofroll, and may need to be undercut or repaired. Some undercutting or repair of unstable subgrade soils should be anticipated during pavement subgrade preparation. If construction will occur during wet times of the year (such as during the spring or fall months) or immediately following extended periods of rain, then seasonal reduction of the near surface soil strength will occur. This may cause additional unstable or pumping subgrade areas for constructability concerns.

The actual quantity of the subgrade undercut or stabilization should be determined by ECS at the time of construction.

6.1.6 Site Temporary Dewatering

None of the borings encountered a measureable groundwater level. However, seasonal variations in precipitation and site drainage conditions can cause the accumulation of water in the upper soils, particularly within existing fill and more permeable granular soils underlain by less permeable clayey soils. Where excavations extend less than 2 feet below the groundwater level, initial attempts to control water may be accomplished by pumping from sump pits in the excavation bottom, which are backfilled with AASHTO Size No. 57 Stone or open-graded bedding material. If water control cannot be maintained with sump pumps, or where excavations extend more than 2 feet below the static groundwater level, a more substantial excavation dewatering system, such as a temporary well point system, may be required to control groundwater seepage during construction. Dewatering should continue until all earthwork operations and backfilling have extended above the water table.

Lowering the static groundwater level can adversely affect nearby structures, utilities and other construction. We recommend any dewatering scheme be reviewed by ECS and a contractor who specializes in this type of work prior to its implementation.

6.1.7 Subgrade Stabilization

Subgrade Benching: Fill should not be placed on ground with a slope steeper than 5H:1V. The ground should be benched so as to allow for fill placement on a horizontal surface.

Subgrade Compaction: Upon completion of subgrade documentation, the exposed subgrade within the 5-foot expanded pavement area limits should be moisture conditioned to within -1 to +3 percent of the soil's optimum moisture content to a depth of 10 inches, and be compacted with suitable equipment (minimum 10-ton vibratory roller for granular soils or a sheepsfoot roller for cohesive soils). The subgrade within the expanded pavement limits should be compacted to a dry density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557). Beyond these areas, compaction should be to at least 90 percent. ECS should be called on to document the achievement of proper subgrade compaction.

Subgrade Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits for structures, pavements, fills, and slopes, etc. We recommend performing field density testing of subgrade soils at the frequencies listed in Table 6.1.1 of this report.

Table 6.1.1 Frequency of Subgrade Compaction Testing

Location	Frequency of Tests
Pavement Areas	1 test per 10,000 sq. ft.
Other Non-Critical Areas	1 test per 10,000 sq. ft.

Subgrade Stabilization: In some areas, particularly low-lying, wet areas of the site, undercutting of excessively soft materials may be considered inefficient. In such areas the use of a reinforcing geotextile or geogrid might be employed, under the advisement of ECS. Suitable stabilization materials may include medium duty woven geotextile fabrics or geogrids. The suitability and employment of reinforcing or stabilization products should be determined in the field by ECS personnel, in accordance with project specifications.

6.2 EARTHWORK OPERATIONS

6.2.1 Engineered Fill Materials

Product Submittals: Prior to placement of engineered fill, representative bulk samples (about 50 pounds) of on-site and off-site borrow should be submitted to ECS for laboratory testing, which will include natural moisture content, grain-size distribution, and moisture-density relationships for compaction. Import materials should be tested prior to being hauled to the site to determine if they meet project specifications.

Satisfactory Engineered Fill Materials: Engineered fills should consist of approved materials, free of organic matter and debris, contain no particle sizes greater than 3 inches in the largest dimension, and have a Liquid Limit and Plasticity Index less than 40 and 15, respectively. Open-graded materials, such as coarser sands and gravels (SP and GP), which contain void space in their mass should not be used in engineered fills unless properly encapsulated within a filter geotextile.

If the fill is to provide non-frost susceptible characteristics, it must be classified as a clean GW, GP, SW or SP per Unified Soil Classification System (ASTM D-2487).

Unsatisfactory Materials: Unsatisfactory engineered fill materials, which do not satisfy the requirements for suitable materials, include topsoil and organic materials (PT, OH, OL), silt (ML), sandy silt (ML), elastic Silt (MH), silty clay (CL-ML), sandy silty clay (CL-ML) and high plasticity clay (CH). Topsoil is not recommended to be used as engineered fill, but may be suitable for use within future landscape areas. A landscape architect should approve any materials proposed for use in future landscape areas.

Pea gravel is not recommended to be used as engineered fill. Pea gravel has round/smooth characteristics, no fines and does not interlock when compacted, which makes it more susceptible to future movement and instability resulting in excessive and variable settlement.

On-Site Borrow Suitability: The on-site soil, with the exception of silty clay (CL-ML) and fat clay (CH), may be feasible to use as engineered fill, but should be further evaluated and approved by ECS prior to its use. On-site soil used as engineered fill must not contain an adverse amount of organic matter, and must be free of frozen matter, deleterious materials, over-sized material (maximum 3-inch particle diameter), or chemicals that may result in the material being classified as "contaminated." Depending on the conditions at the time of construction, the use of on-site soil for foundation support may not be practical, and use of an imported high quality granular material may be needed for foundation support. The material used as engineered fill must be considered low volume change material with a maximum Liquid Limit of 40 and maximum Plasticity Index of 15, unless specifically tested and found to have low volume change properties and approved by ECS. The soils must be compacted within a narrow range of the materials optimum moisture content. The soil samples had relatively high moisture contents so the contractor should expect some drying of on-site soil prior to reuse as engineered fill. The soil should not be compacted too dry as it may lose its apparent stability if it later becomes wet. The suitability of engineered fill materials should be checked by ECS prior to placement. Sorting to remove over-sized material (i.e. cobbles) should be expected at this site prior to re-use of the on-site soil as engineered fill.

Natural soil deposits considered unsuitable by virtue of their plasticity are present on the site. The moisture contents of many of the samples were observed to generally be more than 5 percent above the optimum moisture contents of the material. The construction team should anticipate moisture conditioning (mostly drying) of subgrade soils and engineered fill lifts at this site. Soil chemical modification may be helpful to reduce moisture contents of subgrade soils and fills.

6.2.2 Compaction

Engineered Fill Compaction: Engineered fill within the expanded pavement limits should be placed in maximum 8-inch thick loose lifts, moisture conditioned as necessary to within -1 to +3 percent of the soil's optimum moisture content, and be compacted with suitable equipment to a dry density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557). Beyond these areas, the engineered fill should be compacted to at least 90 percent. ECS should be called on to document the achievement of proper fill compaction.

Fill Compaction Control: The expanded limits of the proposed construction areas should be well defined, including the limits of the fill zones for pavements and embankment slopes, etc., at the

time of fill placement. Grade controls should be maintained throughout the filling operations. All filling operations should be observed on a full-time basis by a qualified representative of ECS to document the achievement of the minimum compaction requirements. Field density testing of fills should be performed at the frequencies shown in Table 6.2.1, but not less than 2 tests per lift.

Table 6.2.1 Frequency of Compaction Tests in Fill Areas

Location	Frequency of Tests
Pavement Areas	1 test per 10,000 sq. ft. per lift
Utility Trenches	1 test per 200 linear ft. per lift
All Other Non-Critical Areas	1 test per 10,000 sq. ft. per lift

Compaction Equipment: Compaction equipment suitable to the soil type being compacted should be used to compact the subgrades and fill materials. Sheepsfoot compaction equipment should be suitable for the fine-grained soils (Clays). A vibratory steel drum roller or plate compactor should be used for compaction of coarse-grained soils (Sands and Gravels) as well as for sealing compacted surfaces.

Fill Placement Considerations: Fill materials should not be placed on frozen soils, on frost-heaved soils, and/or on excessively wet soils. Borrow fill materials should not contain frozen materials at the time of placement, and all frozen or frost-heaved soils should be removed prior to placement of engineered fill or other fill soils and aggregates. Scarify, aerate and moisture condition excessively wet soils or aggregates.

At the end of each work day, all fill areas should be graded to facilitate drainage of any precipitation and the surface should be sealed by use of a smooth-drum roller to limit infiltration of surface water. During placement and compaction of new fill at the beginning of each workday, the contractor may need to scarify existing subgrades to a depth of 4 inches or more so that a weak plane will not be formed between the new fill and the existing subgrade soils.

Drying and compaction of wet soils is typically difficult during the cold, winter months. Accordingly, earthwork should be performed during the warmer, drier times of the year, if practical. Proper drainage should be maintained during the earthwork phases of construction to reduce ponding of water which has a tendency to degrade subgrade soils. Alternatively, if these soils cannot be stabilized by conventional methods as previously discussed, chemical modifications of the subgrade soils, such as with lime, cement or other materials, may be utilized to adjust the moisture content. If lime or cement is utilized to control moisture contents and/or for stabilization, then ECS recommends the use of Quick Lime, Calciment® or regular Type 1 cement. The soil modification procedure, such as determination of the quantity of additive, and mixing and curing procedures, should be evaluated before implementation. The contractor should be required to minimize dusting or implement dust control measures.

Where fill materials will be placed to widen existing embankment fills, or placed up against sloping ground, the soil subgrade should be scarified, and the new fill benched and keyed into the existing material. Fill material should be placed in horizontal lifts. In confined areas such as utility trenches, portable compaction equipment and thin lifts of 3 inches to 4 inches may be required to achieve specified degrees of compaction.

We recommend the grading contractor have equipment on site during earthwork for both drying and wetting fill soils. We do not anticipate significant problems in controlling moisture during dry weather, but moisture control may be difficult during winter months or extended periods of rain. The control of moisture content of clay soils can be difficult when these soils become wet. Further, construction traffic can easily degrade soils that have an elevated moisture content.

6.3 PAVEMENT SUBGRADE OBSERVATIONS

Pavement Subgrade Verification: ECS should be called on to observe and test exposed subgrade within the expanded pavement limits prior to engineered fill placement and pavement construction to check achievement of adequate subgrade preparation. A proofroll using a loaded dump truck should be performed in their presence at that time. Once subgrades have been prepared to the satisfaction of ECS, subgrades should be properly compacted and new engineered fill can be placed. Existing subgrades to a depth of at least 10 inches and all engineered fill should be properly moisture conditioned and compacted to the required in-place density. ECS should check the condition of the prepared subgrade prior to placement of the subbase stone and pavement. If there will be significant time lag between the subgrade check and placement of the subbase stone and pavement, ECS may need to recheck the condition of the subgrade before placement of stone and pavement. Prior to final pavement construction, the subgrade may require scarification, moisture conditioning, and re-compaction to restore stable conditions.

6.4 UTILITY INSTALLATIONS

Utility Subgrades: The native soils encountered in our exploration are expected to be generally suitable for support of utility pipes. However, we recommend removing all existing fill and soils that contain more than 5 percent organic content from below utilities. The pipe subgrade should be observed and probed for stability by ECS to evaluate the suitability of the encountered materials. Any loose or unsuitable materials encountered at the utility pipe subgrade elevation should be removed and replaced with suitable compacted engineered fill or pipe bedding material.

Utility Backfilling: The granular bedding material should be at least 4 inches thick, but not less than that specified by the project drawings and specifications. Fill placed for support of the utilities, as well as backfill over the utilities, should satisfy the requirements for engineered fill given in this report. Compacted backfill should be free of topsoil, roots, ice, or any other material designated by ECS as unsuitable. The backfill should be moisture conditioned, placed, and compacted in accordance with the recommendations of this report.

6.5 GENERAL CONSTRUCTION CONSIDERATIONS

Moisture Conditioning: During the cooler and wetter periods of the year, the construction team should anticipate delays and additional costs. At these times, reduction of soil moisture may need to be accomplished by mechanical manipulation to lower moisture contents to levels appropriate for compaction. Alternatively, during the drier times of the year, such as the summer months, moisture may need to be added to the soil to provide adequate moisture for successful compaction according to the project requirements.

Subgrade Protection: Measures should be taken to limit site disturbance, especially from rubber-tired heavy construction equipment, and to control and remove surface water from development

areas, including pavement areas. ECS recommends the design team consider designating a haul road and construction staging area to limit the areas of disturbance and to prevent construction traffic from excessively degrading sensitive subgrade soils and existing pavement areas. Haul roads and construction staging areas could be covered with excess depths of aggregate to protect those subgrades. The aggregate can later be removed and used in pavement areas provided it has not been mixed with silty or clayey soils.

Surface Drainage: The contractor should properly maintain surface drainage conditions. Surface water should be directed away from the construction area, and the work area should be sloped away from the construction area at a gradient of 1 percent or steeper to reduce the potential of ponding water and the subsequent saturation of the surface soils. At the end of each work day, the subgrade soils should be sealed by rolling the surface with a smooth drum roller to reduce infiltration of surface water.

Excavation Safety: The contractor should make and maintain all excavations and slopes in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing and constructing stable, excavations and slopes and should shore, slope, or bench the sides of the excavations and slopes as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in OSHA 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; ECS does not imply such responsibility, and the contractor, design team and owner should not infer it.

Excavation Instability: Excavation stability and caving problems may occur in areas containing existing fill soils. The instability problems will generally depend upon the excavation depth, length of time the excavations remain open, inclination of excavation side-walls, magnitude and location of surcharges near the excavations, groundwater levels and the suitability of any dewatering systems if needed.

Existing Construction Considerations: Site preparation will require complete removal and proper disposal of the existing pavement to be removed and any remnants of previous construction, including all underground utilities that are not reused, etc. Disposal of debris should be in accordance with local, state and federal regulations for the material type. It should be noted that any construction remnants left in-place may cause excavation difficulties for new utilities and/or landscape plantings. All excavations must be backfilled with compacted engineered fill performed under engineering controlled conditions.

Removal of the existing pavement and placement of engineered backfill is recommended to be observed and tested by ECS. Alteration to the recommendations of this report may be needed, if conditions different than those noted on the boring logs are revealed below the existing construction.

Existing Fill Considerations: Existing fill was encountered in Boring 2, 3, 4, and 6. Unsuitable materials may have been buried beneath the site surface during previous site grading or construction not detected by the test borings. Questionable material, if encountered, is

recommended to be evaluated by ECS to determine if the material needs to be removed and replaced with engineered fill. Alteration to the recommendations of this report may be needed, if excavations reveal conditions different than those noted on the test boring logs.

Erosion Control: The surface soils may be erodible. Therefore, the Contractor should provide and maintain good site drainage during earthwork operations to maintain the integrity of the surface soils. All erosion and sedimentation controls should be in accordance with sound engineering practices and local requirements.

Bidding/Estimating Considerations: Contractors bidding or undertaking any work at the site should examine the results of the subsurface exploration, satisfy themselves as to the adequacy of the information for bidding and construction, make their own interpretation of the data, and consider the effect it may have on their cost proposal, construction techniques, schedule, and equipment capabilities. Furthermore, contractors should complete any additional fieldwork and investigation they deem necessary to properly prepare a cost proposal for the site work. Soil borings do not provide the same wide-scale view of the subsurface conditions that is obtained during site grading, excavation or other aspects of earthwork construction. Additional scope may be required to obtain more detailed subsurface information needed for earthwork bid preparation, which could include test pits to better understand the lateral and vertical extents of the subsurface materials of concern such as existing undocumented fill. Even with this additional information, budget contingencies should be carried in construction to help cover potential variations in subsurface conditions.

7.0 CLOSING

ECS has prepared this report of findings, evaluations, and recommendations to guide preliminary geotechnical-related design and construction aspects of the project. In fulfilling our obligations and responsibilities, as listed in the proposal, we performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

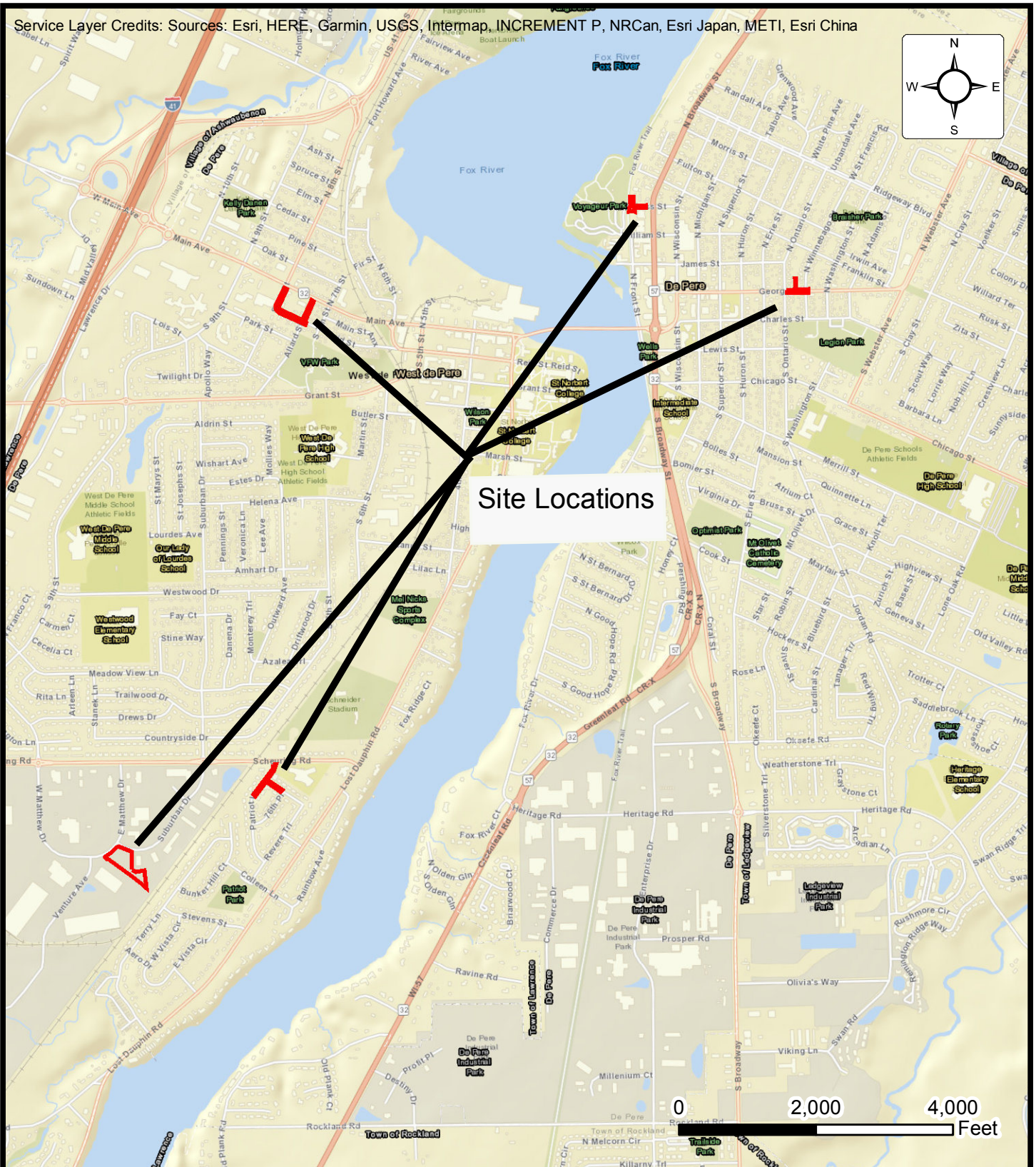
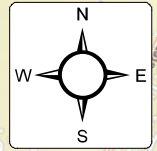
The description of the proposed project is based on information provided to ECS by the City of De Pere. If any of this information is inaccurate, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted immediately so that we can review the report in light of the changes and provide additional or alternate recommendations as may be required to reflect the proposed construction.

We recommend that ECS be retained to review the project's plans and specifications pertaining to our services so that we may evaluate consistency of those plans/specifications with the intent of this geotechnical report.

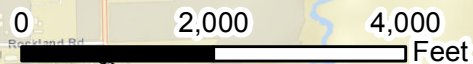
Field observations, and quality assurance testing during earthwork, foundations, floor slabs, utility, pavement, and storm water management device installation are an extension of and integral to the geotechnical design recommendation. We recommend the owner retain these quality assurance services and that ECS be retained to continue our involvement throughout these critical phases of construction to provide general consultation as issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A - Drawings & Reports

Site Location Diagram
Boring Location Diagram



Site Locations

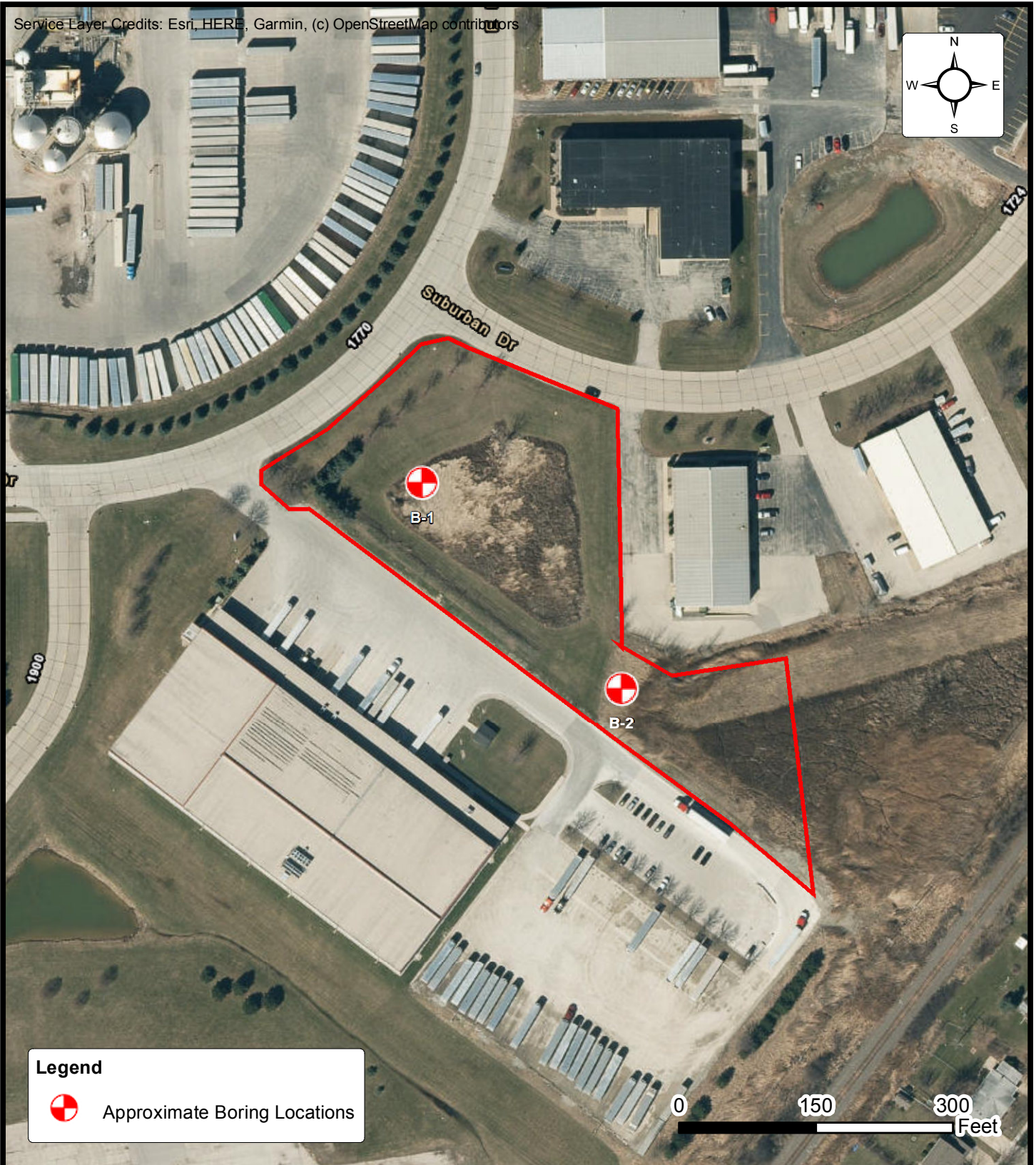


Site Location Diagram DE PERE PROJECT 20-01

VARIOUS STREETS, DE PERE, WISCONSIN

CITY OF DE PERE

ENGINEER CAR
SCALE 1" = 2000'
PROJECT NO. 59:1669-A
SHEET 1 OF 1
DATE 9/30/2019



Legend



Approximate Boring Locations



Boring Location Diagram DE PERE PROJECT 20-01

VARIOUS STREETS, DE PERE, WISCONSIN

CITY OF DE PERE

ENGINEER
CAR

SCALE
1" = 150'

PROJECT NO.
59:1669-A

SHEET
1 OF 5

DATE
9/30/2019



Legend



Approximate Boring Locations



Boring Location Diagram DE PERE PROJECT 20-01

VARIOUS STREETS, DE PERE, WISCONSIN

CITY OF DE PERE

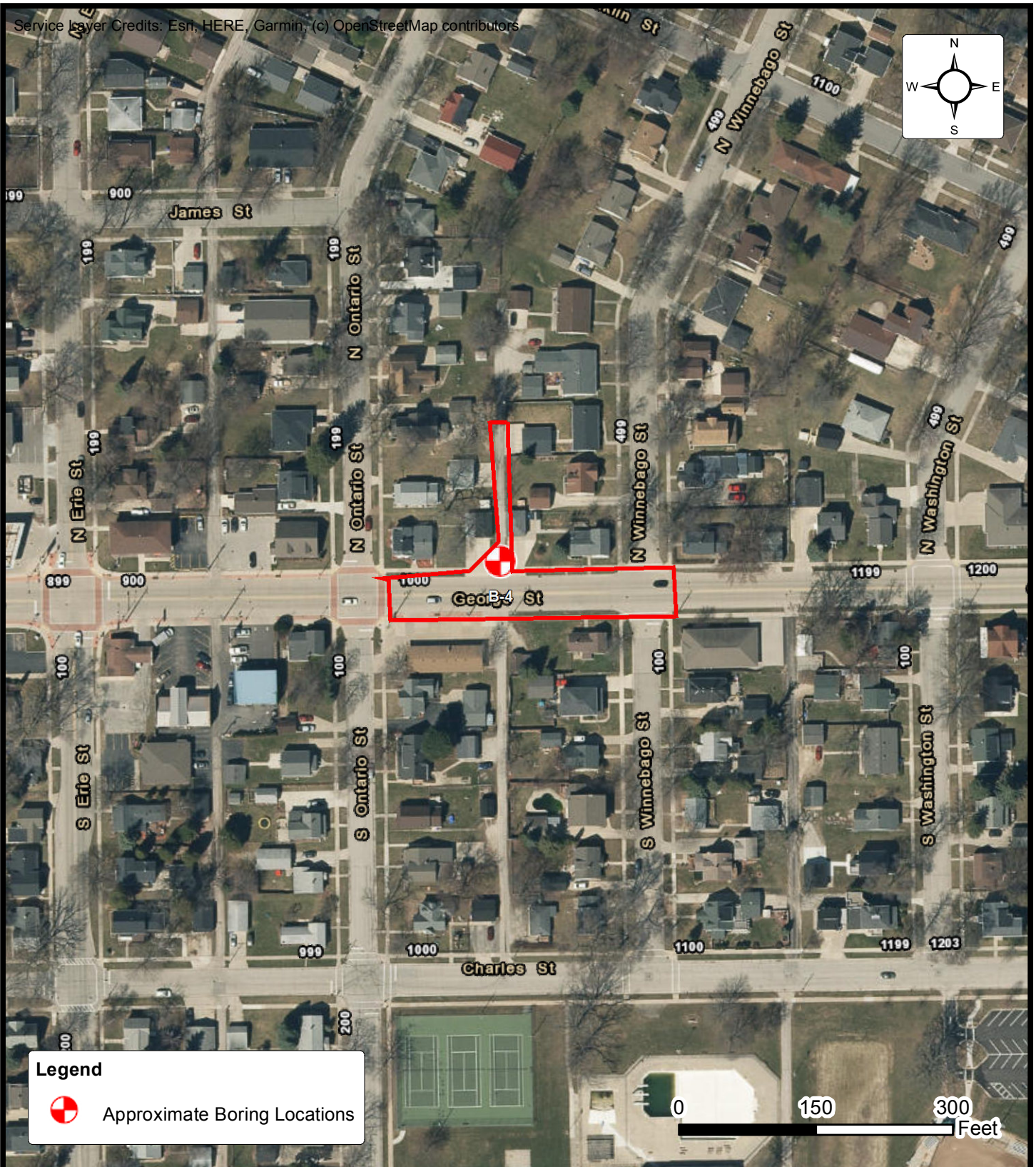
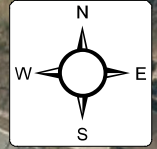
ENGINEER
CAR

SCALE
1" = 150'

PROJECT NO.
59:1669-A

SHEET
2 OF 5

DATE
9/30/2019



Legend



Approximate Boring Locations



Boring Location Diagram DE PERE PROJECT 20-01

VARIOUS STREETS, DE PERE, WISCONSIN

CITY OF DE PERE

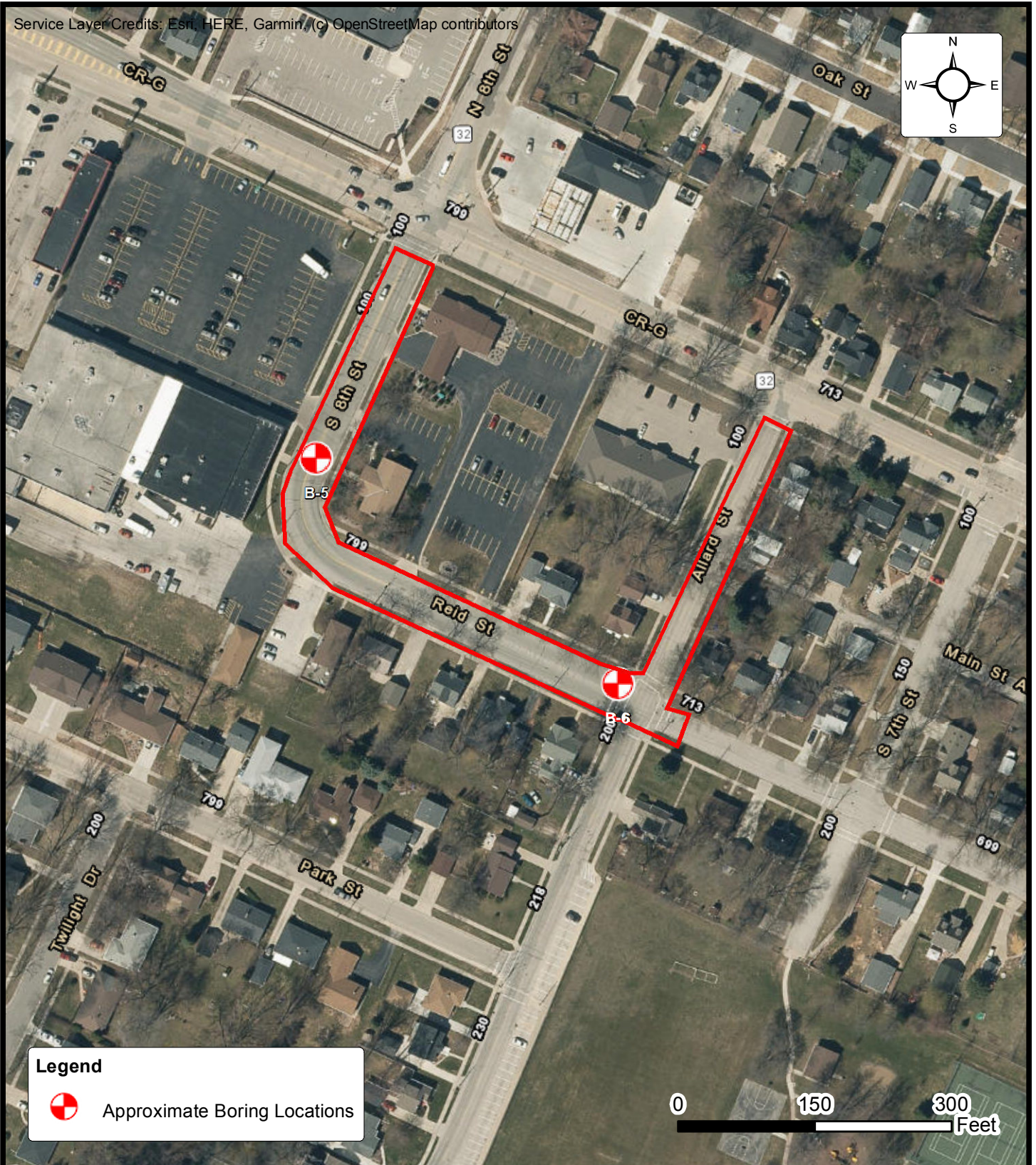
ENGINEER
CAR

SCALE
1" = 150'

PROJECT NO.
59:1669-A

SHEET
3 OF 5

DATE
9/30/2019



Legend



Approximate Boring Locations



Boring Location Diagram
DE PERE PROJECT 20-01

VARIOUS STREETS, DE PERE, WISCONSIN

CITY OF DE PERE

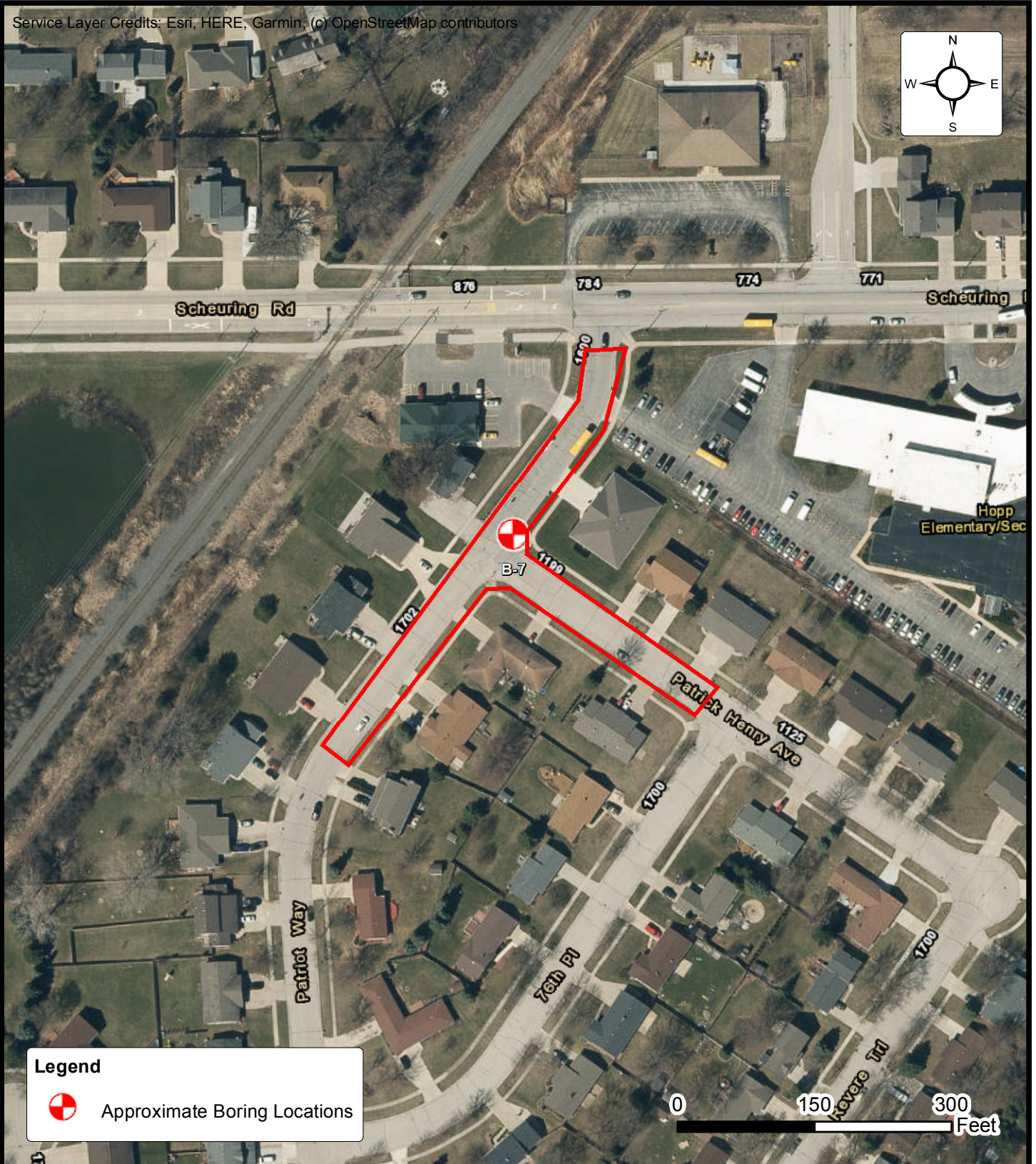
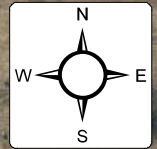
ENGINEER
CAR

SCALE
1" = 150'

PROJECT NO.
59:1669-A

SHEET
4 OF 5

DATE
9/30/2019



Legend



Approximate Boring Locations



Boring Location Diagram DE PERE PROJECT 20-01

VARIOUS STREETS, DE PERE, WISCONSIN

CITY OF DE PERE

ENGINEER
CAR

SCALE
1" = 150'

PROJECT NO.
59:1669-A

SHEET
5 OF 5

DATE
9/30/2019

APPENDIX B - Field Operations

Reference Notes for Boring Logs
Boring Logs 1 through 7
Soil and Site Evaluation - Storm



REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	SHALE
	BRICK
	AGGREGATE BASE COURSE
	FILL³ MAN-PLACED SOILS
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION	
DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Gravel: Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Sand: Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Sand: Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, Q _p ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Medium Stiff
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
Dual Symbol (ex: SW-SM)	10	10
With	15 - 20	15 - 25
Adjective (ex: "Silty")	≥25	≥30

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶		
	WL	Water Level (WS)(WD) (WS) While Sampling (WD) While Drilling
	SHW	Seasonal High WT
	ACR	After Casing Removal
	SWT	Stabilized Water Table
	DCI	Dry Cave-In
	WCI	Wet Cave-In

¹Classifications and symbols per ASTM D 2488-09 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].


⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf).

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.





⁷Minor deviation from ASTM D 2488-09 Note 16.


⁸Percentages are estimated to the nearest 5% per ASTM D 2488-09.

CLIENT City of De Pere	JOB # 1669-A	BORING # 1	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01	ARCHITECT-ENGINEER			

SITE LOCATION De Pere, Brown County, Wisconsin	 <p> ○ CALIBRATED PENETROMETER TONS/FT² 1 2 3 4 5+ PLASTIC LIMIT WATER CONTENT % LIQUID LIMIT % ROCK QUALITY DESIGNATION & RECOVERY RQD% REC.% 20% 40% 60% 80% 100% ⊗ STANDARD PENETRATION BLOWS/FT 10 20 30 40 50+ </p>
East Matthew Drive Storm Pond	

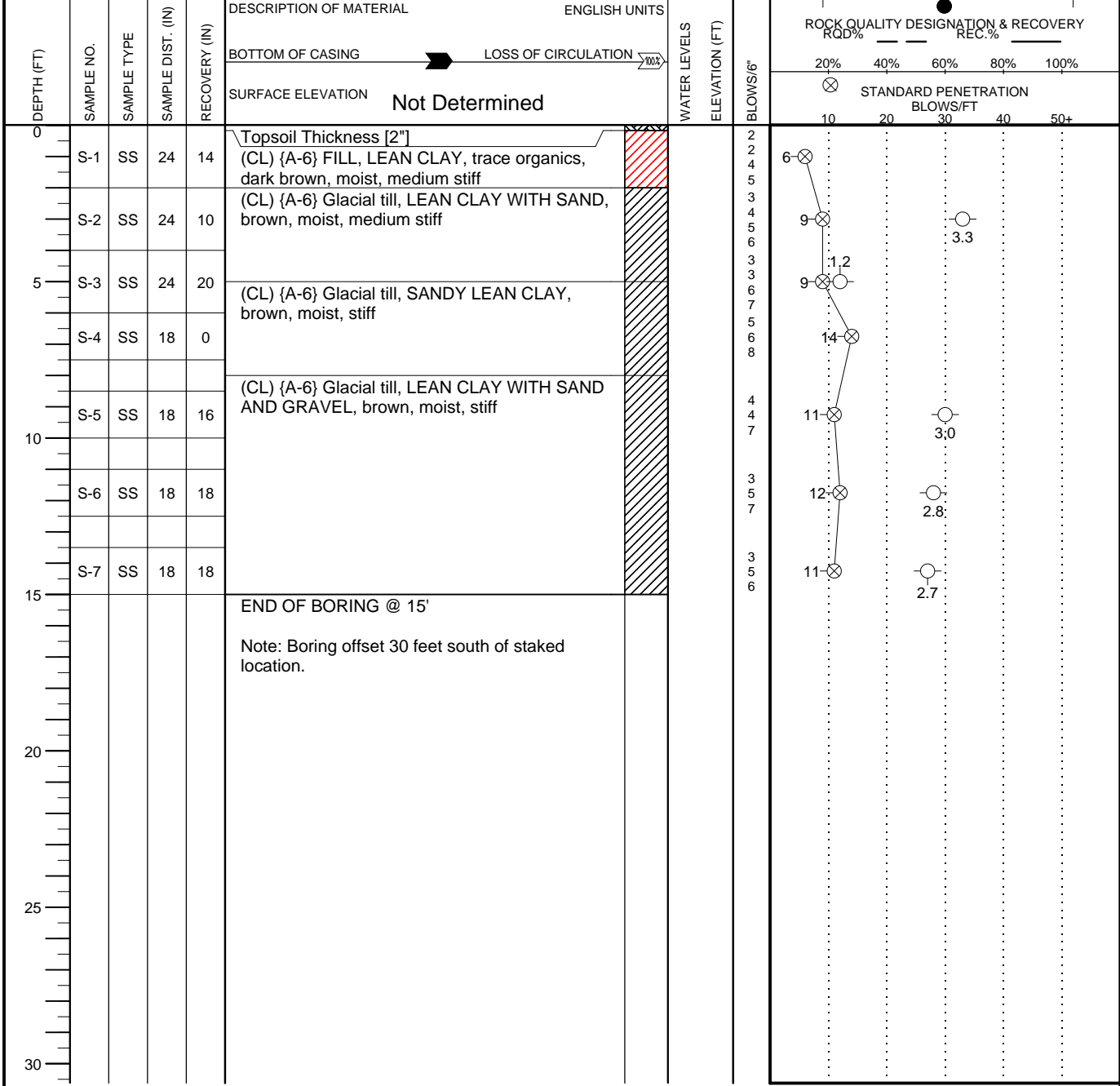
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"	
0					Topsoil Thickness [3"]					
0-2	S-1	SS	24	20	(CH) {A-7-6} Lacustrine, FAT CLAY WITH SEAMS OF SILT, reddish brown with gray, moist, medium stiff to stiff				6	
2-4	S-2	SS	24	8	(CL) {A-6} Glacial till, LEAN CLAY WITH SAND AND GRAVEL, brown, moist, stiff				14	
4-6	S-3	SS	24	20					15	
6-8	S-4	SS	18	4					15	
8-10	S-5	SS	18	14					14	
10-12	S-6	SS	18	8					14	
12-14	S-7	SS	18	18					9	
14-15	S-8	SS	18	13		(CL/ML, CH) {A-4, A-7-6} Lacustrine, SILTY CLAY WITH VARVES OF FAT CLAY, gray and reddish brown, moist, stiff				10
15-17										10
17-18	S-9	SS	18	18						9
18-20					END OF BORING @ 20'				9	
20-22					Note: Boring offset 30 feet west of staked location.				2:0	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%					
 WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/15/19	
 WL(BCR)	 WL(ACR) None		BORING COMPLETED	11/15/19	CAVE IN DEPTH
 WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 20' (AH)

CLIENT City of De Pere	JOB # 1669-A	BORING # 2	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01	ARCHITECT-ENGINEER			


SITE LOCATION
De Pere, Brown County, Wisconsin

East Matthew Drive Storm Pond



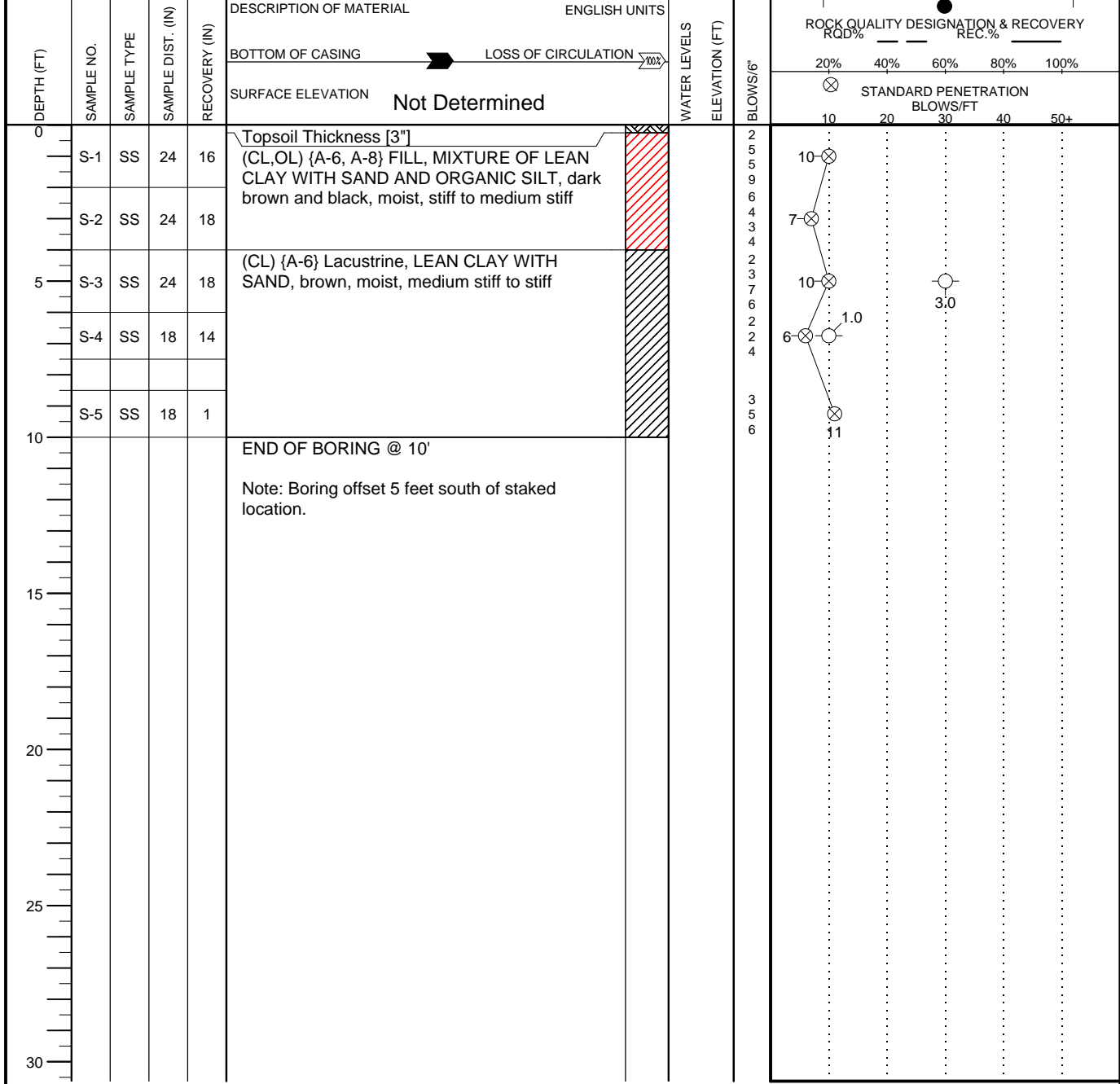
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%

WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/15/19	
WL(BCR)	WL(ACR) None		BORING COMPLETED	11/15/19	CAVE IN DEPTH
WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 15' (AH)

CLIENT City of De Pere	JOB # 1669-A	BORING # 3	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01	ARCHITECT-ENGINEER			


SITE LOCATION
De Pere, Brown County, Wisconsin

Cass Street



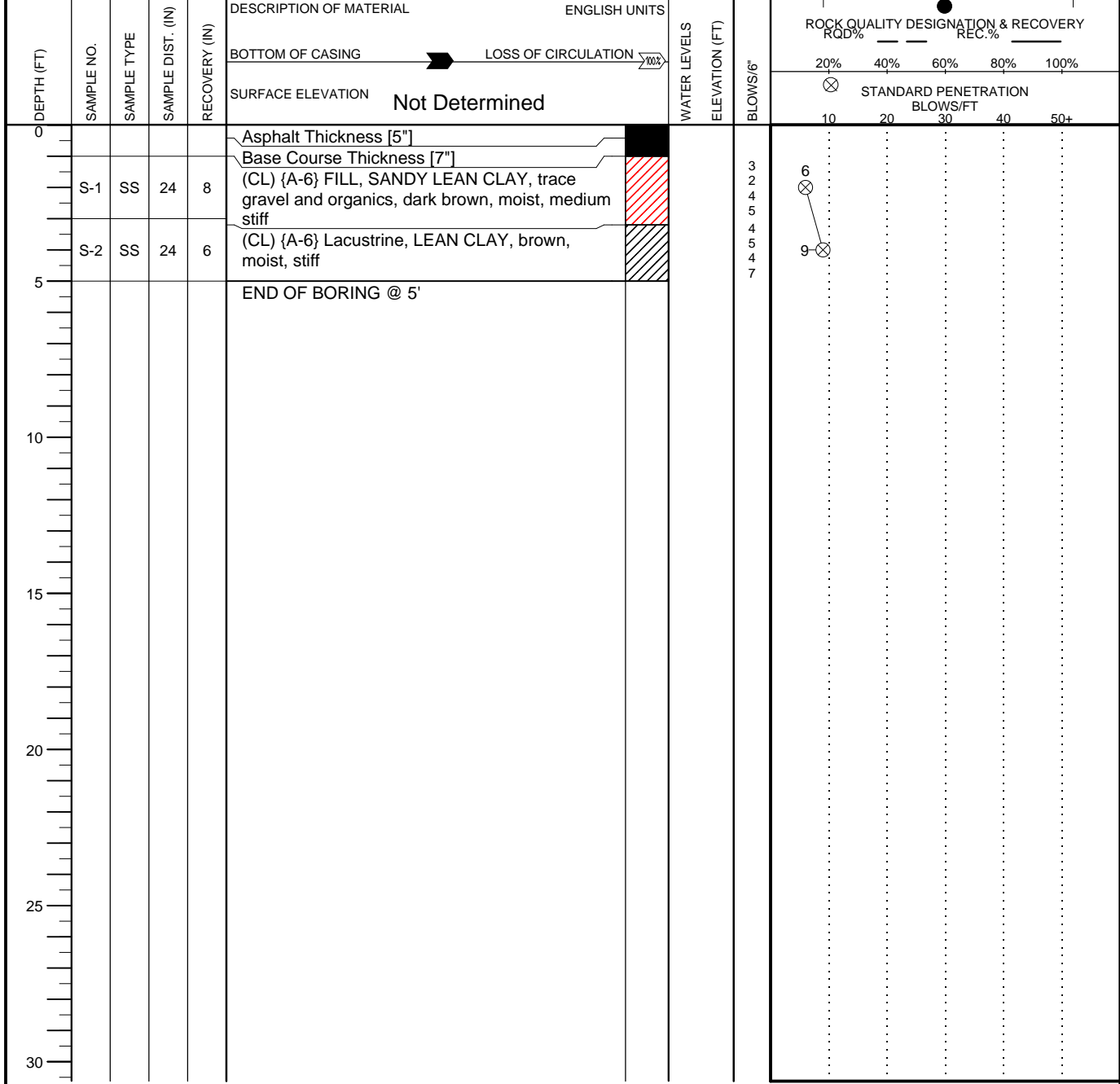
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%

<input checked="" type="checkbox"/> WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/14/19	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/14/19	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 10' (AH)

CLIENT City of De Pere	JOB # 1669-A	BORING # 4	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01	ARCHITECT-ENGINEER			


SITE LOCATION
De Pere, Brown County, Wisconsin

Alley



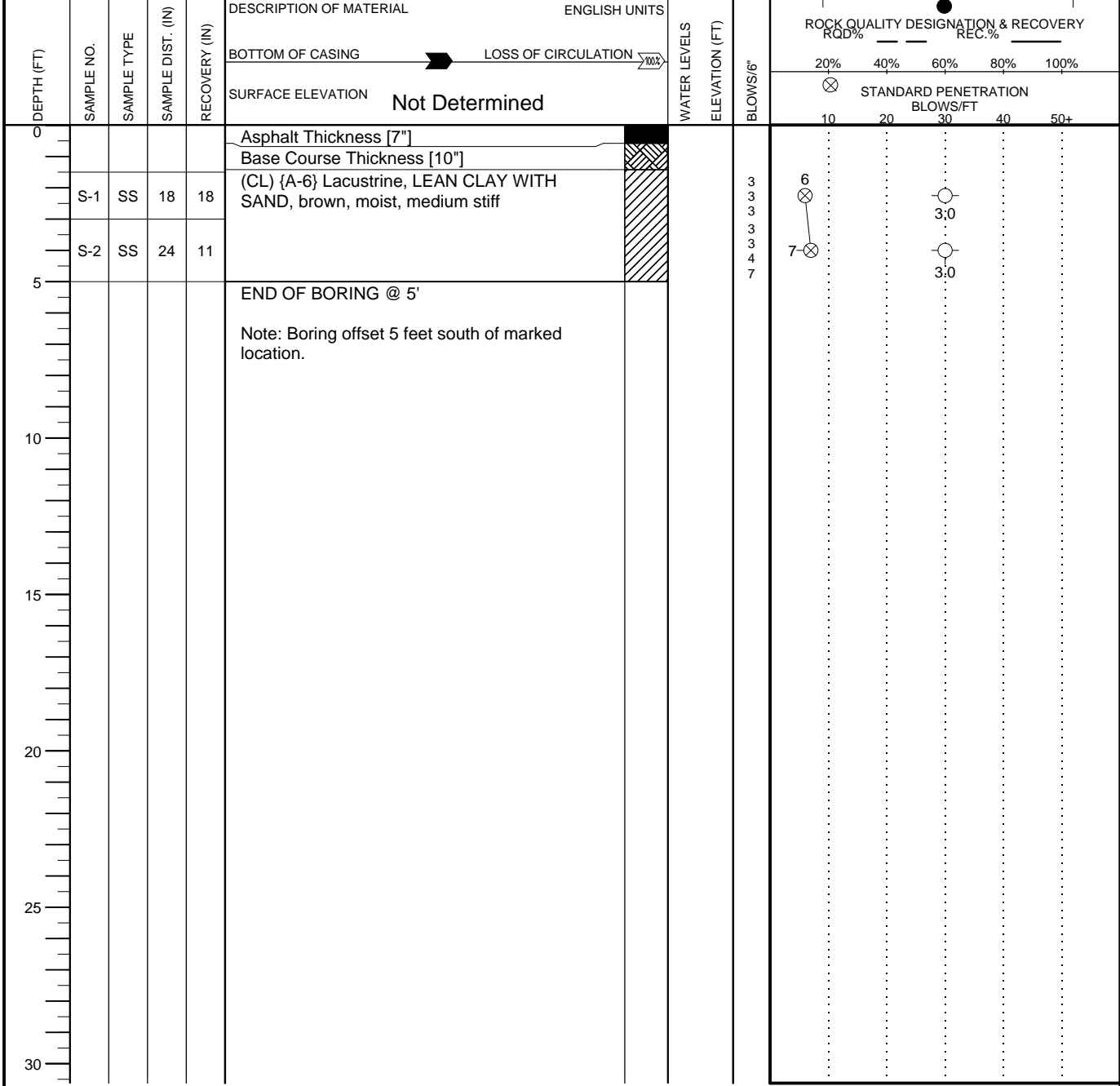
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%

<input checked="" type="checkbox"/> WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/14/19	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/14/19	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 5' (AH)

CLIENT City of De Pere	JOB # 1669-A	BORING # 5	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01	ARCHITECT-ENGINEER			


SITE LOCATION
De Pere, Brown County, Wisconsin

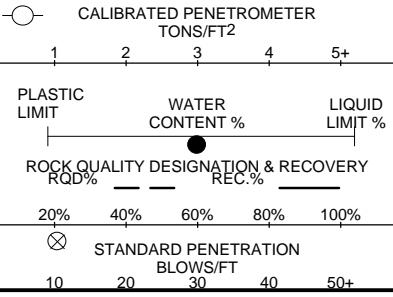
South 8th Street



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%


<input checked="" type="checkbox"/> WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/14/19	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/14/19	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 5' (AH)

CLIENT City of De Pere	JOB # 1669-A	BORING # 6	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01		ARCHITECT-ENGINEER		

SITE LOCATION De Pere, Brown County, Wisconsin			 <p>○ CALIBRATED PENETROMETER TONS/FT² 1 2 3 4 5+</p> <p>PLASTIC LIMIT WATER CONTENT % LIQUID LIMIT %</p> <p>●</p> <p>ROCK QUALITY DESIGNATION & RECOVERY RQD% REC.%</p> <p>20% 40% 60% 80% 100%</p> <p>⊗ STANDARD PENETRATION BLOWS/FT 10 20 30 40 50+</p>
Reid Street			

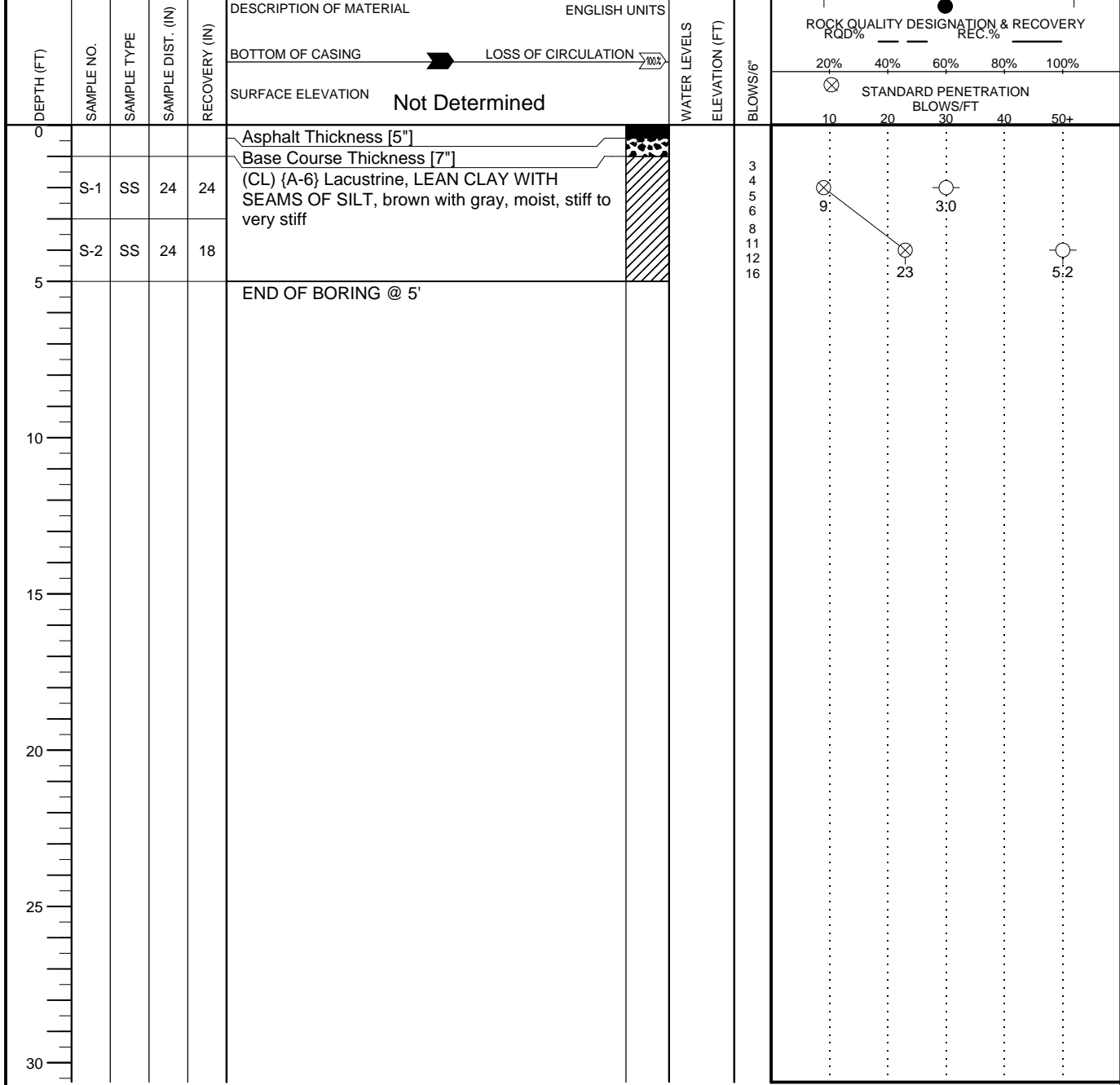
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Asphalt Thickness [7"]				
					Base Course Thickness [10"]				
	S-1	SS	18	10	(CL, OL) {A-6, A-8} FILL, A MIXTURE OF LEAN CLAY WITH SAND AND ORGANIC SILT, dark brown and black, moist, stiff				5 6 7
	S-2	SS	24	24	(CL) {A-6} Lacustrine, LEAN CLAY WITH SEAMS OF SILT, brown with gray, moist, stiff				4 5 6 7 10
5					END OF BORING @ 5'				
10									
15									
20									
25									
30									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%					
<input checked="" type="checkbox"/> WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/14/19	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/14/19	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 5' (AH)

CLIENT City of De Pere	JOB # 1669-A	BORING # 7	SHEET 1 OF 1	
PROJECT NAME De Pere Project 20-01	ARCHITECT-ENGINEER			

SITE LOCATION
De Pere, Brown County, Wisconsin

Patriot Way



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU 20% 40% 60% 80% 100%

<input checked="" type="checkbox"/> WL None	WS <input type="checkbox"/>	WD <input checked="" type="checkbox"/>	BORING STARTED	11/14/19	
<input checked="" type="checkbox"/> WL(BCR)	<input checked="" type="checkbox"/> WL(ACR) None		BORING COMPLETED	11/14/19	CAVE IN DEPTH
<input checked="" type="checkbox"/> WL			RIG Truck	FOREMAN BB/CB	DRILLING METHOD 3 1/4" HSA 0' to 5' (AH)

APPENDIX C - Supplemental Report Documents

Important Information about This Geotechnical-Engineering Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual site-wide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* **Confront the risk of moisture infiltration** by including building-envelope or mold specialists on the design team. **Geotechnical engineers are not building-envelope or mold specialists.**



Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

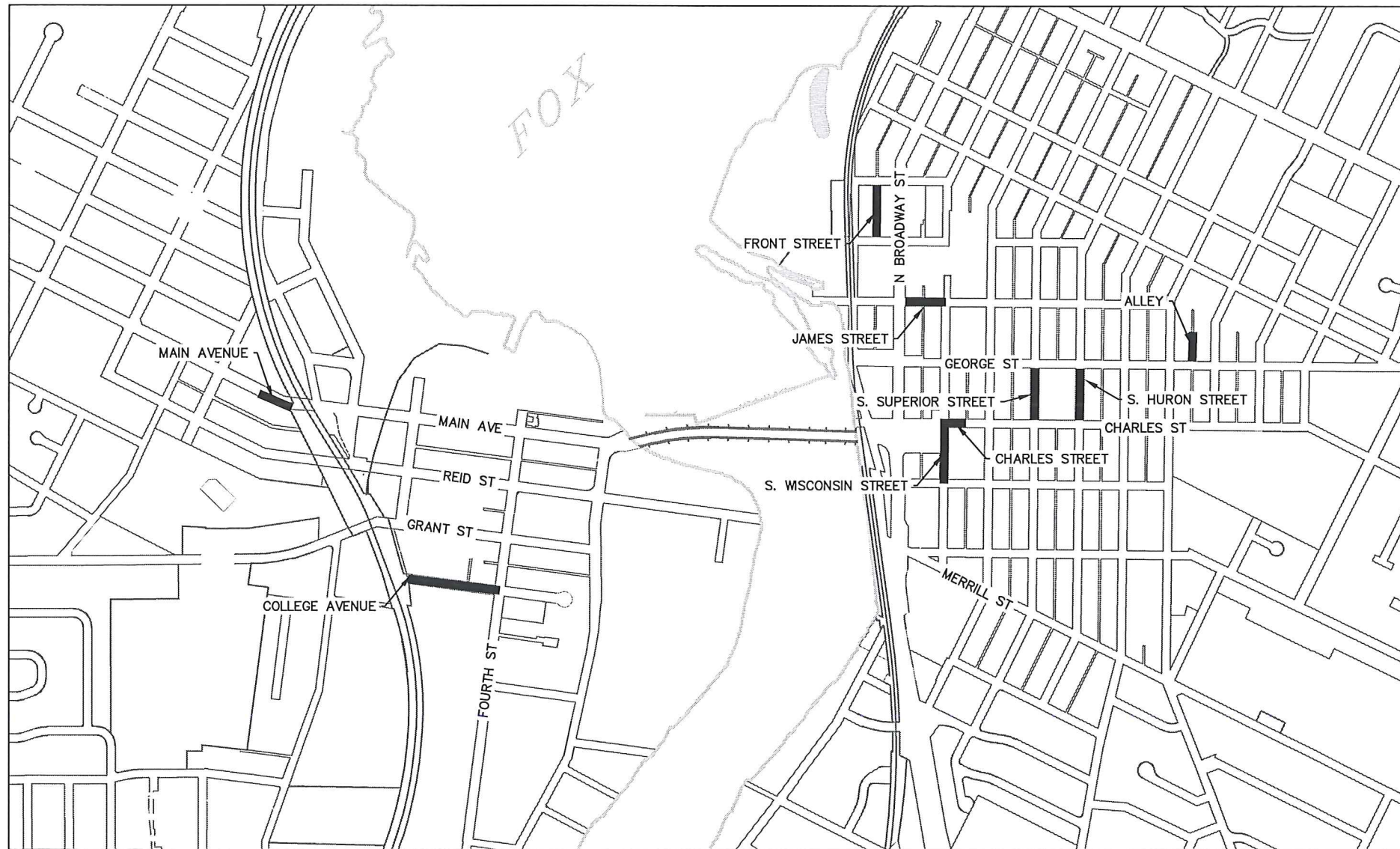
PROJECT# 20-02

STREET RECONSTRUCTION AND UTILITY RELAY

CITY OF DE PERE



ENGINEER DIVISION
925 S. SIXTH ST
DE PERE, WI, 54115



SITE LOCATION MAP
N.T.S.

SHEET NO.	DESCRIPTION
G001	TITLE SHEET
G002	STANDARD ABBREVIATION & SYMBOLS
G003	STANDARD ABBREVIATION & STMBOLS (GRAEF)
G004 - G007	TYPICAL SECTIONS
C100	MAIN AVENUE PLAN SHEET
C101	ALLEY PLAN AND PROFILE SHEET
C102	CHARLES STREET PLAN AND PROFILE SHEETS
C103	WISCONSIN STREET PLAN AND PROFILE SHEETS
C104 - C106	HURON STREET PLAN AND PROFILE SHEETS
C107 - C110	SUPERIOR STREET PLAN AND PROFILE SHEETS
C111 - C113	FRONT STREET PLAN AND PROFILE SHEETS
C114 - C118	COLLEGE AVENUE PLAN AND PROFILE SHEETS
C119 - C122	JAMES STREET PLAN AND PROFILE SHEETS
C300 - C310	CROSS SECTIONS
C400 - C401	SURVEY/MAPPING (EROSION CONTROL, ALIGNMENT, ETC.)
C500 - C503	PROJECT DETAILS
C504 - C514	CONSTRUCTION DETAILS
A201	WINDWALL PLAN, ELEVATIONS, SECTIONS SHEET
E001 - E601	ELECTRICAL PLAN SHEETS
F100 - F420	WATER WALL PLAN SHEETS
L100 - L500	LANDSCAPING PLAN SHEETS

**CITY OF DE PERE
BOARD OF PUBLIC WORKS**

2/14/20 *E.P. Rakers*
DATE CITY ENGINEER

2/14/2020 *James M. Walsh*
DATE CITY ADMINISTRATOR

2/14/2020 *Michael J. Walsh*
DATE MAYOR

STAMPS:



NOTE: CITY ENGINEER STAMP COVERS CITY PLANS AND MODIFICATIONS
MADE TO GRAEF PLANS AFTER BID DATE OF APRIL 18, 2019

LIST OF STANDARD ABBREVIATIONS

ADT	AVERAGE DAILY TRAFFIC	N	NORTH
AGGR	AGGREGATE	NB	NORTHBOUND
AH	AHEAD	NC	NORMAL CROWN
ASPH	ASPHALT	NE	NORTHEAST
B/B	BACK TO BACK	NO	NUMBER
BARR	BARRICADE	NTS	NOT TO SCALE
BC	BACK OF CURB	NW	NORTHWEST
BK	BACK	O	OIL
BL	BASELINE	O&C	OIL AND CHIP
BLDG	BUILDING	OBLIT	OBLITERATE
BM	BENCHMARK	OD	OUTSIDE DIAMETER
BOW	BACK OF SIDEWALK	PC	POINT OF CURVATURE
BsMT	BASEMENT	PCC	POINT OF COMPOUND CURVE
C	CUT	PCC	PORTLAND CEMENT CONCRETE
C&G	CURB AND GUTTER	PE	PEDESTAL
C/C	CENTER TO CENTER	PLE	PERMANENT LIMITED EASEMENT
CABC	CRUSHED AGGREGATE BASE COURSE	PVMT	PAVEMENT
CB	CATCH BASIN	PE	PRIVATE ENTRANCE
CE	CONSTRUCTION ENTRANCE	PI	POINT OF INTERSECTION
CI	CAST IRON PIPE	PJF	PRE-FORMED JOINT FILLER
CL	CENTERLINE	PL	PROPERTY LINE
CMP	CORRUGATED METAL PIPE	POC	POINT OF CURVE
CNTY	COUNTY	POT	POINT ON TANGENT
CO	CLEANOUT	PP	POLYETHYLENE
CONC	CONCRETE	PRC	POINT OF REVERSE CURVATURE
CONSTR	CONSTRUCTION	PROJ	PROJECT
CONSTR JT	CONSTRUCTION JOINT	PROP	PROPOSED
CP	CONTROL POINT	PSI	POUND PER SQUARE INCH
CTH	COUNTY TRUNK HIGHWAY	PT	POINT OF TANGENCY
CTRL JT	CONTROL JOINT	PVC	POLYVINYL CHLORIDE
CTV	CABLE TV	R	RANGE OR RADIUS
CY	CUBIC YARD	RCP	REINFORCED CONCRETE PIPE
D	DEPTH	REBAR	REINFORCEMENT BAR
DIA	DIAMETER	REL	RELOCATE
DI	DUCTILE IRON PIPE	REM	REMAINING
DISCH	DISCHARGE	REQD	REQUIRED
DW	DRIVEWAY	RL	REFERENCE LINE
E	EAST (SEE ELEC BELOW)	ROW	RIGHT OF WAY
EA	EACH	RP	REFERENCE POINT
EB	EASTBOUND	RR	RAILROAD
EBS	EXCAVATION BELOW SUBGRADE	RT	RIGHT
ECS	EXTERNAL CHIMNEY SEAL	RW	RETAINING WALL
EL	ELEVATION	S	SOUTH
ELEC	ELECTRIC (E WHEN USED IN LINE STYLE)	SALV	SALVAGE
EMB	EMBANKMENT	SAN	SANITARY
ENTR	ENTRANCE	SB	SOUTHBOUND
EP	EDGE OF PAVEMENT	SDWK	SIDEWALK
EW	ENDWALL	SE	SOUTHEAST
EXC	EXCAVATION	SF	SQUARE FEET
EXIST	EXISTING	SHLDR	SHOULDER
F	FILL	SY	SQUARE YARD
F/F	FACE TO FACE	SS	STORM SEWER
FDN	FOUNDATION	SSD	STOPPING SIGHT DISTANCE
FE	FIELD ENTRANCE	STA	STATION
FERT	FERTILIZER	STD	STANDARD
FIN GR	FINISHED GRADE	STH	STATE HIGHWAY TRUNK
FL	FLOWLINE	STM	STORM
FO	FIBER OPTIC	STP	SEWAGE TREATMENT PLANT
FOW	FRONT OF SIDEWALK	STRUCT	STRUCTURE OR STRUCTURAL
FT	FOOT	SW	SOUTHWEST
FTG	FOOTING	TAN	TANGENT
G	GAS	T	TOWN (T WHEN USED FOR TELEPHONE LINE)
GV	GAS VALVE	TEL	TELEPHONE
GW	GUY WIRE	TEMP	TEMPORARY
HDPE	HIGH DENSITY POLYETHYLENE	TLE	TEMPORARY LIMITED EASEMENT
HR	HANDICAP RAMP	TOC	TOP OF CURB
HSE	HOUSE	TOW	TOP OF WATER
HT	HEIGHT	TRANS	TRANSITION
HYD	HYDRANT	TYP	TYPICAL
I	INTERSECTION ANGLE	UG	UNDERGROUND
ICS	INTERNAL CHIMNEY SEAL	USH	US HIGHWAY
ID	INSIDE DIAMETER	VC	VERTICAL CURVE
IN	INCH	VERT	VERTICAL
INL	INLET	VOL	VOLUME
INTERS	INTERSECTION	VPC	VERTICAL POINT OF CURVATURE
INV	INVERT	VPI	VERTICAL POINT OF INTERSECTION
IP	IRON PIPE OR PIN	VPRC	VERTICAL POINT OF REVERSE CURVE
JCT	JUNCTION	VPT	VERTICAL POINT OF TANGENCY
L	LENGTH (OF CURVE)	W	WEST
LC	LONG CHORD OF CURVE	WB	WESTBOUND
LP	LIGHTPOLE	WM	WATERMAIN
LS	LIFT STATION OR LUMP SUM	WSO	WATER SHUTOFF VALVE
LT	LEFT	WTP	WATER TREATMENT PLANT
MAINT	MAINTENANCE	WV	WATER VALVE
MATL	MATERIAL	WWTP	WASTE WATER TREATMENT PLANT
MB	MAILBOX	YD	YARD
MH	MANHOLE		
MP	MARKER POST		

MAPPING & TOPOGRAPHY SYMBOLOGY

DESCRIPTION	SYMBOL	
	EXISTING	PROPOSED
BENCHMARK		
BUSH		
CATCH BASIN		
CABLE TV BOX		
CONTROL POINT		
ELECTRICAL BOX		
EROSION CONTROL - INELT		
FIELD INLET		
GAS VALVE		
HEDGE		
HYDRANT		
IRON PIPE		
LIGHTPOLE		
MAILBOX		
MANHOLE ELECTRIC		
MANHOLE SANITARY		
MANHOLE STORM		
MONITORING WELL		
POWER POLE		
LIGHT POLE		
SIGN		
SIGNAL HEAD, TRAFFIC SIGNAL STANDARD, PEDESTAL BASE		
SIGNAL HEAD, TRAFFIC SIGNAL POLE, TRANSFORMER BASE		
STUMP		
TELEPHONE MANHOLE		
TELEPHONE PEDESTAL		
TREE		
WELL		
WATER SERVICE VALVE		
BUTTERFLY WATER VALVE		
WATER VALVE		

GENERAL CONSTRUCTION NOTES:

- ALL ELEVATIONS ARE REFERENCED TO NAVD 88.
- THE WORK UNDER THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE CITY OF DE PERE, CURRENT CONSTRUCTION SPECIFICATIONS AND THESE SPECIAL PROVISIONS AND PLANS, AND THE LATEST ADDITION OF THE WISCONSIN DEPARTMENT OF TRANSPORTATION STANDARDS SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION SPECIFICATIONS, LATEST EDITION, WHERE REFERENCED IN THE CITY SPECIFICATIONS.
- ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION AND SHALL CONFIRM TO THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES CONSTRUCTION SITE EROSION CONTROL AND TECHNICAL STANDARDS.
- EXISTING UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EXACT LOCATIONS AND ELEVATIONS OF ALL UTILITIES, WHETHER SHOWN OR NOT, FROM THE OWNERS OF THE RESPECTIVE UTILITIES. ALL UTILITIES OWNERS SHALL BE NOTIFIED BY THE CONTRACTOR 72 HOURS PRIOR TO EXCAVATION.

MAPPING & TOPOGRAPHY SYMBOLOGY

DESCRIPTION	SYMBOL	
	PLAN	PROFILE
EXISTING SANITARY SEWER LINE		
PROPOSED SANITARY SEWER LINE		
EXISTING STORM SEWER LINE		
PROPOSED STORM SEWER LINE		
EXISTING WATER MAIN LINE		
PROPOSED WATER MAIN LINE		
EXISTING ELECTRICAL LINE		
EXISTING GAS MAIN LINE		
EXISTING TELEPHONE LINE		
EXISTING CABLE TV LINE		
EXISTING SANITARY LATERAL		
EXISTING WATER SERVICE		
RIGHT OF WAY		
PROPERTY LINE		
EASEMENT		
SILT FENCE EROSION CONTROL		
EXISTING FIBER OPTIC		
EXISTING MAJOR CONTOUR		
EXISTING MINOR CONTOUR		
PROPOSED MAJOR CONTOUR		
PROPOSED MINOR CONTOUR		

PROFILE

EXISTING SANITARY SEWER LINE	
PROPOSED SANITARY SEWER LINE	
EXISTING STORM SEWER LINE	
PROPOSED STORM SEWER LINE	
EXISTING WATER MAIN LINE	
PROPOSED WATER MAIN LINE	

PATCH SYMBOLS

ASPHALTIC CONCRETE PAVEMENT		CRUSHED AGGREGATE BASE COURSE	
PORTLAND CEMENT CONCRETE			



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4060 FAX 920-339-4071

STANDARD ABBREVIATIONS AND SYMBOLS

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

NO.	DATE	BY	REVISIONS / ISSUES	
			REMARKS	



GENERAL NOTES

1. ALL COORDINATES LISTED ARE TO GROUND COORDINATES BASED ON THE BROWN COUNTY COORDINATE SYSTEM.
2. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. REMOVAL DIMENSIONS SHALL CORRESPOND TO THE PROPOSED WORK INDICATED ON OTHER SITE/CIVIL PLAN SHEETS.
4. ALL REMOVALS OR OTHER WORK WITHIN THE PUBLIC RIGHT OF WAY MUST BE COORDINATED WITH THE CITY OF DE PERE, PRIOR TO BEGINNING WORK.
5. PROVIDE CONTROL JOINTS FOR EXTERIOR CONCRETE AT EVENLY SPACED INTERVALS NOT TO EXCEED SEVEN (7) FEET UNLESS NOTED OTHERWISE ON THE DRAWINGS.
6. REPAIR OR REPLACE ALL CURB, PAVING, UTILITIES AND LAWN AREAS SCHEDULED TO REMAIN IF DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES.
7. STORM SEWER STRUCTURE STATIONING AND RIM ELEVATIONS FOR STRUCTURES WITHIN THE ROADWAY ARE REFERENCED TO THE CURB FLANGE LINE UNLESS OTHERWISE NOTED.
8. SYMBOLS AND ABBREVIATIONS ON THIS SHEET APPLY TO GRAEF PLANS.

PROPOSED UTILITIES

- STM --- PROPOSED STORM SEWER
- SAN --- PROPOSED SANITARY SEWER
- W --- PROPOSED WATER MAIN
- PROPOSED INLET
- ⊕ PROPOSED WATER VALVE
- PROPOSED MANHOLE
- ⊕ PROPOSED HYDRANT

CURVE ABBREVIATIONS

- LEN. SEGMENT LENGTH
- RAD. RADIUS
- Δ ANGLE
- CHD. CURVE CHORD LENGTH
- CHD. DIR. CURVE CHORD DIRECTION
- TAN. CURVE EXTERNAL TANGET

LEGEND AND ABBREVIATIONS

- G --- EXISTING GAS LINE
- E --- EXISTING ELECTRIC LINE
- FO --- EXISTING FIBER OPTIC LINE
- TV --- EXISTING CABLE TELEVISION LINE
- T --- EXISTING TELEPHONE LINE
- STM --- EXISTING STORM SEWER
- SAN --- EXISTING SANITARY SEWER
- W --- EXISTING WATER MAIN
- ⊕ ⊗ EXISTING INLET AND CATCH BASIN
- ⊕ WV EXISTING WATER VALVE
- ⊕ EXISTING WATER HYDRANT
- EXISTING MANHOLE
- EXISTING POWER POLE
- ⊗ TELEPHONE/TELEGRAPH POLE
- ⊗ LIGHT POLE
- ⊗ T EXISTING PEDESTAL TELEPHONE
- GUY EXISTING GUY POLE
- ⊕ EXISTING SIGN
- ⊕ EXISTING MAIL BOX
- ⊕ EXISTING CONTROL BOX
- ⊕ EXISTING TREE LINE
- ⊕ EXISTING DECIDUOUS TREE (SIZE)
- ⊕ EXISTING CONIFEROUS TREE (SIZE)
- ⊕ EXISTING STUMP
- ⋯ EXISTING HEDGES
- EASE --- EXISTING EASEMENT LINE
- P/L --- PROPERTY LINE
- R/W --- EXISTING R/W LINE
- ▲ EXISTING P-K NAIL/HUB
- EXISTING 1" DIA. IRON PIPE
- ⊕ C.C. EXISTING CHISELD CROSS

ABBREVIATIONS

- | | | | |
|---------|------------------------------------|---------|---------------------------|
| ASPH. | ASPHALT | N. | NORTH |
| B. | BEND | NE. | NORTH EAST |
| BLDG. | BUILDING | NMH. | PROPOSED SANITARY MANHOLE |
| BM. | BENCHMARK | NO. | NUMBER |
| BIT. | BITUMINOUS | OFF. | OFFSET |
| BVCS. | BEGINNING VERTICAL CURVE STATION | PT. | POINT |
| BVCE. | BEGINNING VERTICAL CURVE ELEVATION | P.T. | POINT OF TANGET |
| CB. | CATCHBASIN | P.I. | POINT OF INTERSECT |
| CP. | CONTROL POINT | P.C. | POINT OF CURVE |
| C/L. | CENTERLINE | PAV'T. | PAVEMENT |
| CONC. | CONCRETE | PROP. | PROPOSED |
| CMCP. | CORRUGATED METAL CULVERT PIPE | PVC. | POLYVINYL CHLORIDE |
| CMPA. | CORRUGATED METAL PIPE ARCH | PVC P. | PVC PIPE |
| C. & G. | CURB & GUTTER | R. | RIGHT |
| D. | DEPTH | R=. | RADIUS |
| D/W. | DRIVEWAY | R. BAR. | REBAR |
| DIA. | DIAMETER | REQ'D. | REQUIRED |
| E. | EAST | R/L. | REFERANCE LINE |
| E. | EAST | R/W. | RIGHT-OF-WAY |
| EA. | EACH | RCP. | REINFORCED CONCRETE PIPE |
| EL. | ELEVATION | SAN. | SANITARY |
| ELEV. | ELEVATION | S/W. | SIDEWALK |
| EVCS. | ENDING VERTICAL CURVE STATION | S. | SLOPE OR SOUTH |
| EVCE. | ENDING VERTICAL CURVE ELEVATION | SE. | SOUTH EAST |
| EXIST. | EXISTING | STM. | STORM |
| G.V. | GATE VALVE | T. | TEE |
| HYD. | HYDRANT | TMH. | PROPOSED STORM MANHOLE |
| INL. | INLET | TIL. | PROPOSED STORM INLET |
| INV. | INVERT | TYP. | TYPICAL |
| I.E. | INVERT ELEVATION | V.F. | VERTICAL FEET |
| I.P. | IRON PIPE | W. | WEST |
| LAT. | LATERAL | WM. | WATER MAIN |
| L. | LEFT OR LENGTH | W.V. | WATER VALVE |
| L.F. | LINEAR FOOT | W/. | WITH |
| MH. | MANHOLE | | |
| M.E. | MATCH EXISTING | | |
| MISC. | MISCELLANEOUS | | |
| N.T.S. | NOT TO SCALE | | |
| N. | NORTHING | | |



1150 Springhurst Drive,
Suite 201
Green Bay, WI 54304-5947
920 / 592 9440
920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND
UTILITY RELAY

400 James Street
De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted

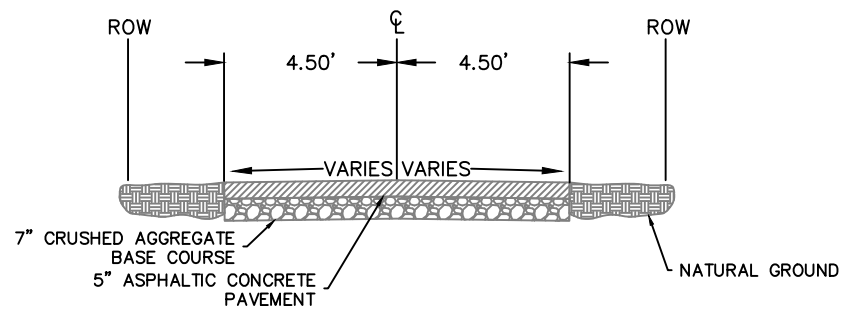
SHEET TITLE:

SYMBOLS, ABBREVIATIONS, AND
GENERAL NOTES

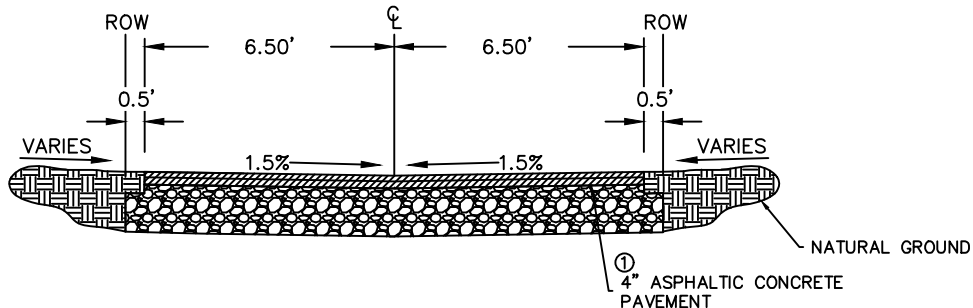
SHEET NUMBER:

G003

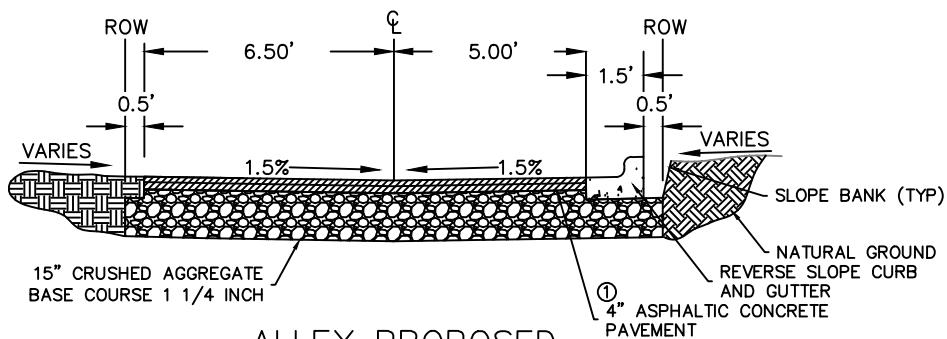
X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James\G003 SYM_ABV_NOTES 2/17/2020 11:30 AM



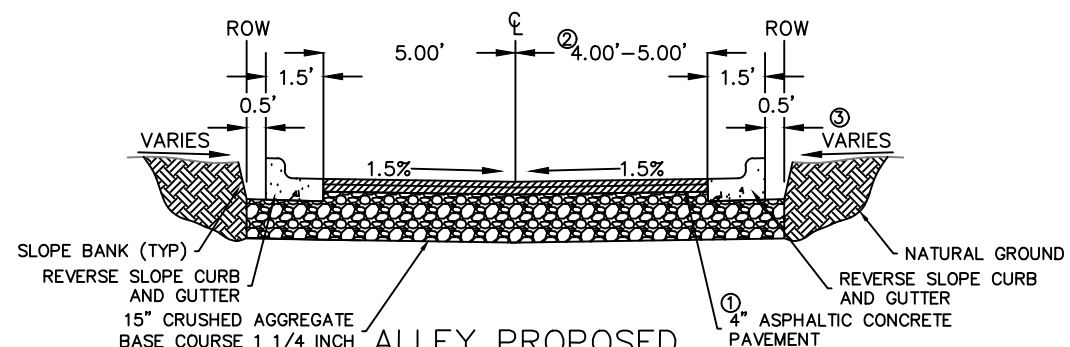
ALLEY EXISTING
TYPICAL SECTION
(STA 10+39 TO STA 12+80)



ALLEY PROPOSED
TYPICAL SECTION
(STA 11+94 TO STA 13+00)



ALLEY PROPOSED
TYPICAL SECTION
(STA 11+52 TO STA 11+94)



ALLEY PROPOSED
TYPICAL SECTION
(STA 10+39 TO STA 11+52)

NOTES:

① 4" ASPHALTIC CONCRETE PAVEMENT CONSISTS OF:
2.25" BINDER COURSE : 3 LT 58-28 S
1.75" SURFACE COURSE : 4 LT 58-28 S

② WIDTH CHANGES AS FOLLOWS:

RIGHT SIDE LANE	
STATION 10+39 TO 10+60	5.0'
STATION 10+60 TO 10+65	5.0' TO 4.4'
STATION 10+65 TO 11+01	4.4' TO 4.0'
STATION 11+01 TO 11+05	4.0' TO 5.0'
STATION 11+05 TO 11+52	5.0'

③ VARIABLE HEIGHT CURB AT GARAGE (SEE PLAN)



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CITY OF DE PERE
TYPICAL SECTIONS

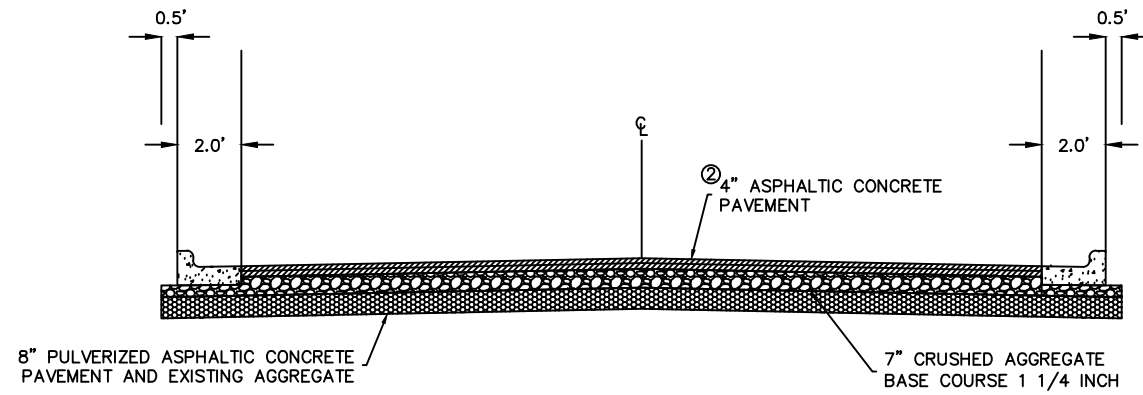
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

	BY	DATE
SURVEYED	NA	NA
DRAWN	KAD	01-2020
DESIGNED	KAD	01-2020
CHECKED	EPR	01-2020

REVISIONS / ISSUES		
NO.	DATE	BY

PAGE NO.

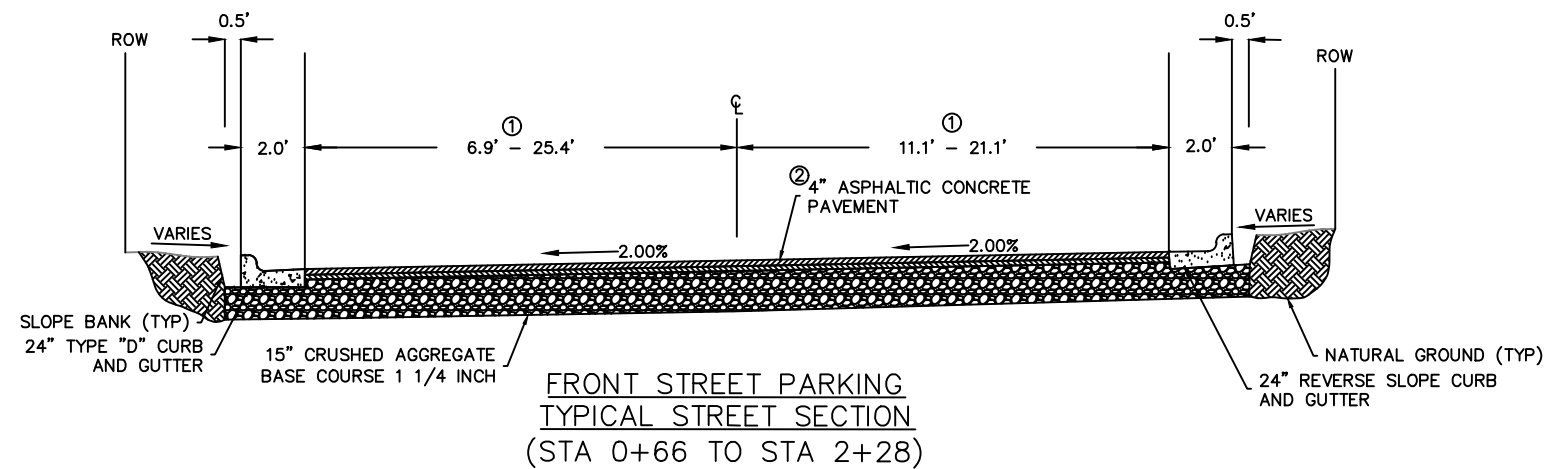
G004



TYPICAL STREET SECTION
WITH PULVERIZED ASPHALTIC
CONCRETE PAVEMENT
(JAMES STREET, COLLEGE
AVENUE AND FRONT STREET)

NOTES:

USE EXCESS PULVERIZED MATERIAL FROM JAMES STREET AND COLLEGE AVENUE FOR THE CONSTRUCTION OF FRONT STREET PARKING LOT



FRONT STREET PARKING
TYPICAL STREET SECTION
(STA 0+66 TO STA 2+28)

NOTES:

① WIDTH CHANGES AS FOLLOWS:

LEFT SIDE LANE	RIGHT SIDE LANE
STATION 0+66 TO 2+17 - 25.4'	STATION 0+66 TO 0+75 - 12.1' TO 11.3'
STATION 2+17 TO 2+28 - 25.4' TO 6.9'	STATION 0+75 TO 1+00 - 11.3' TO 21.1'
	STATION 1+00 TO 2+00 - 21.1'
	STATION 2+00 TO 2+28 - 21.1' TO 11.1'

② 4" ASPHALTIC CONCRETE PAVEMENT CONSISTS OF:
2.25" BINDER COURSE : 3 LT 58-28 S
1.75" SURFACE COURSE : 4 LT 58-28 S



CITY OF DE PERE

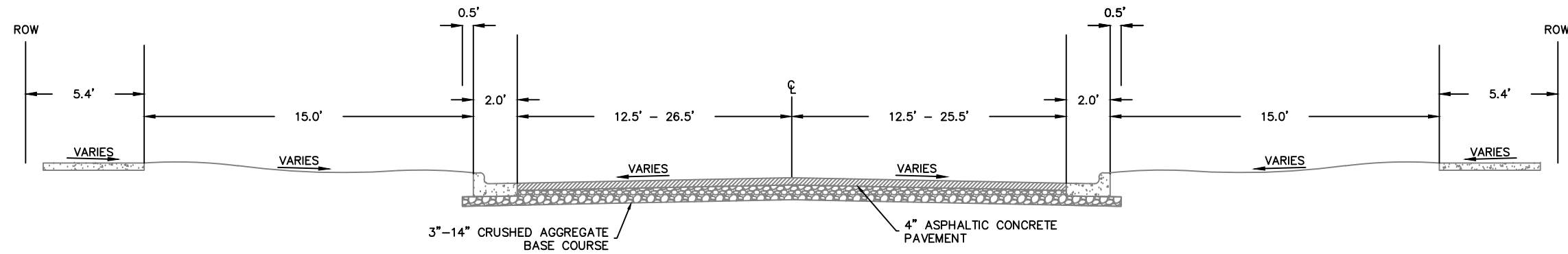
ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CITY OF DE PERE
TYPICAL SECTIONS

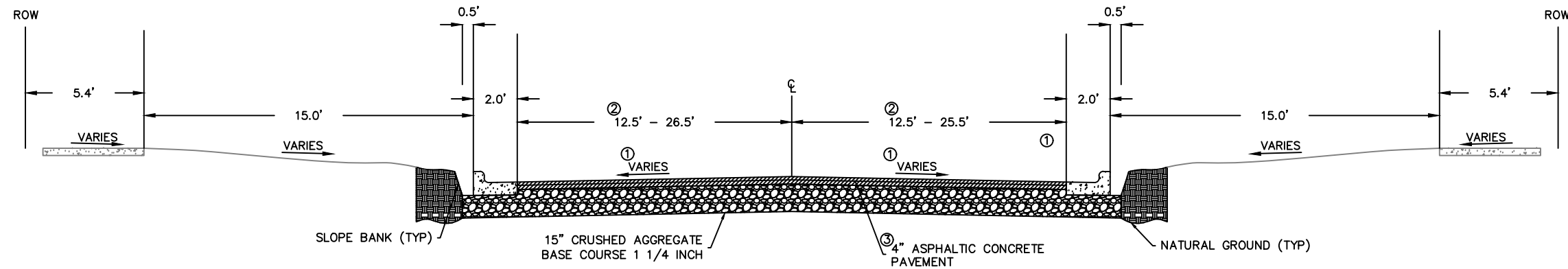
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

	BY	DATE
SURVEYED	NA	NA
DRAWN	KAD	01-2020
DESIGNED	KAD	01-2020
CHECKED	EPR	01-2020

REVISIONS / ISSUES			
NO.	DATE	BY	REMARKS



COLLEGE AVENUE EXISTING
TYPICAL STREET SECTION
(STA 200+58 TO STA 206+45)



COLLEGE AVENUE
TYPICAL STREET SECTION
(STA 200+58 TO STA 206+45)

NOTES:

① CROSS SLOPE VARIES THROUGH PROJECT AS FOLLOWS:

LEFT SIDE
STATION 200+58 TO 201+00 - 0.00%
STATION 201+00 TO 201+25 - 0.00% TO 1.00%
STATION 201+25 TO 201+50 - 1.00% TO 2.00%
STATION 201+50 TO 203+00 - 2.00%
STATION 203+00 TO 203+50 - 2.00% TO 2.50%
STATION 203+50 TO 203+95 - 2.50% TO 3.00%
STATION 203+95 TO 206+45 - 3.00%

RIGHT SIDE
STATION 200+58 TO 201+00 - 0.00%
STATION 201+00 TO 201+25 - 0.00% TO 2.00%
STATION 201+25 TO 203+95 - 2.00%
STATION 203+95 TO 204+50 - 2.00% TO 1.00%
STATION 204+50 TO 206+45 - 1.00%

③ 4" ASPHALTIC CONCRETE PAVEMENT CONSISTS OF:
2.25" BINDER COURSE : 3 LT 58-28 S
1.75" SURFACE COURSE : 4 LT 58-28 S

② WIDTH CHANGES AS FOLLOWS:

LEFT SIDE LANE
STATION 200+58 TO 200+83 - 0.0' TO 26.5'
STATION 200+83 TO 201+21 - 26.5' TO 12.5'
STATION 201+21 TO 206+45 - 12.5'

RIGHT SIDE LANE
STATION 200+58 TO 200+83 - 0.0' TO 25.5'
STATION 200+83 TO 201+21 - 25.5' TO 12.5'
STATION 201+21 TO 206+45 - 12.5'



CITY OF DE PERE

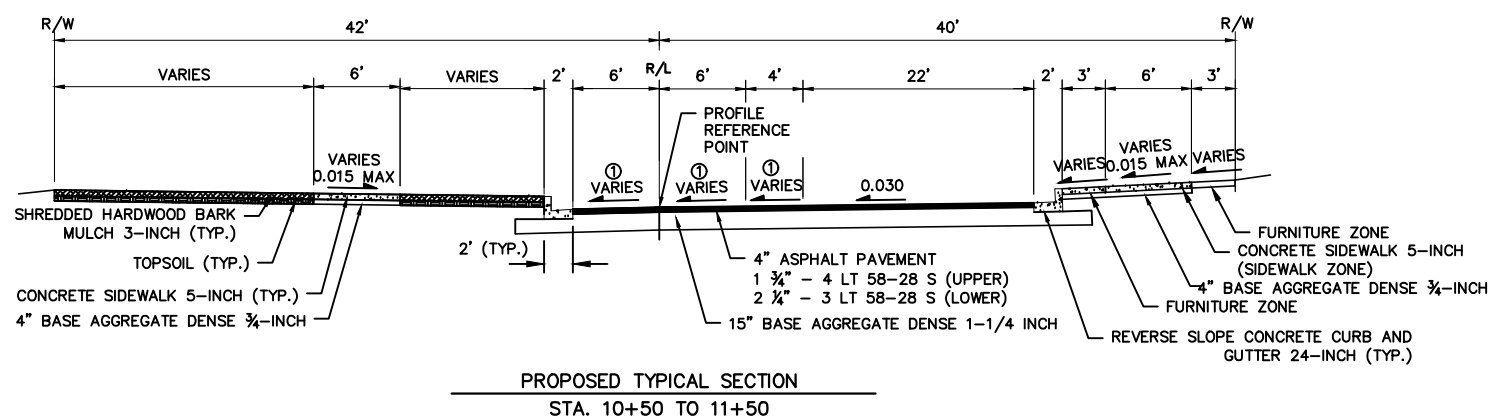
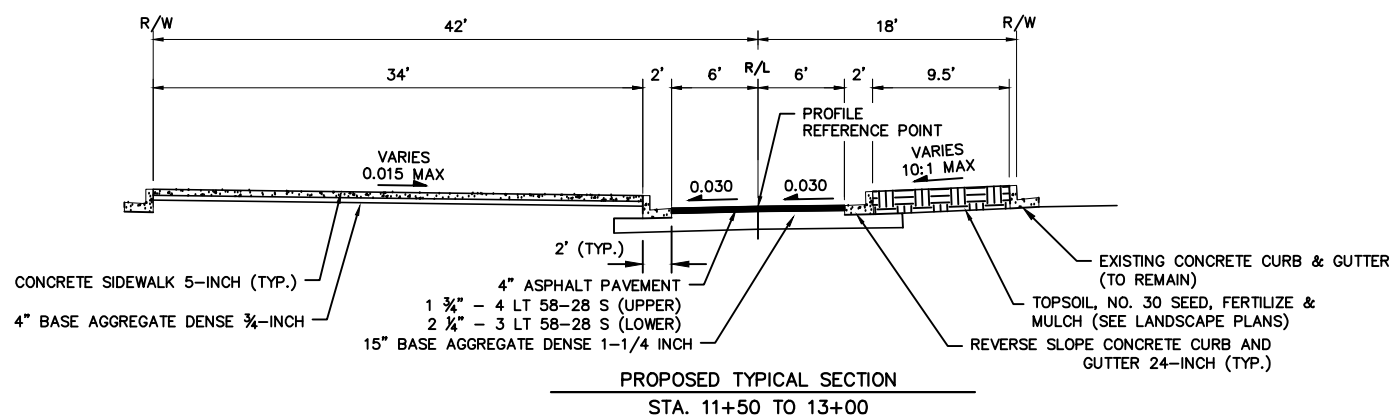
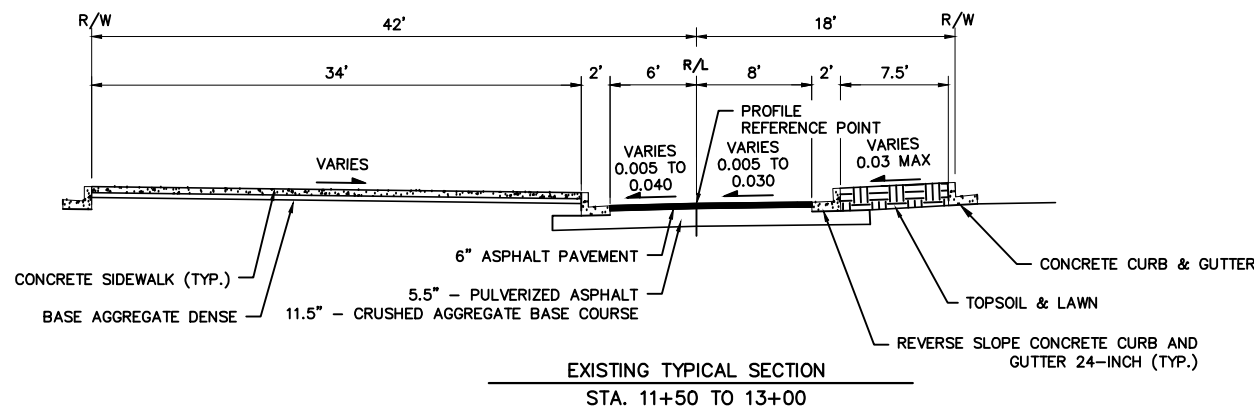
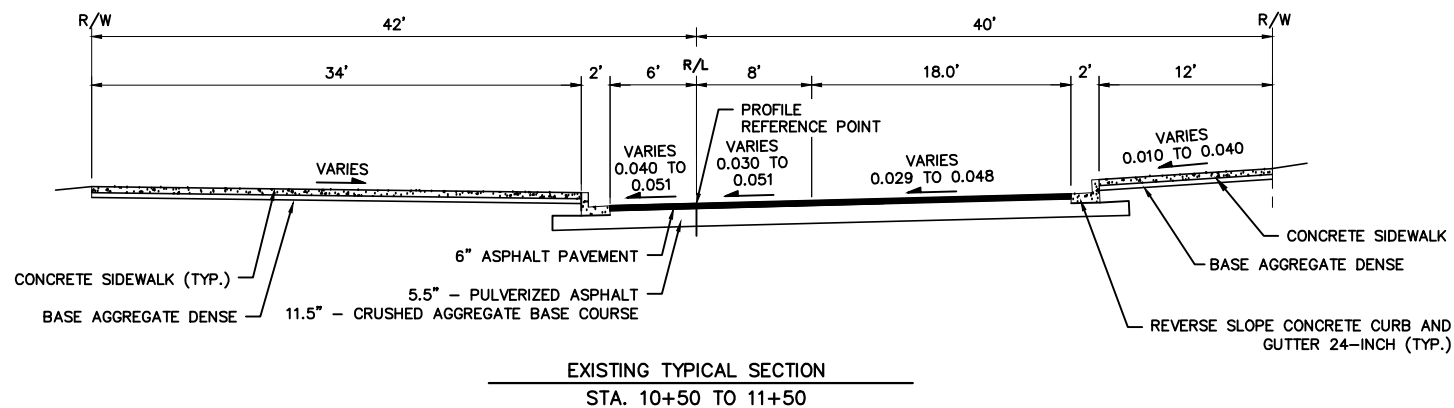
ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CITY OF DE PERE
TYPICAL SECTIONS

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

	BY	DATE
SURVEYED	NA	NA
DRAWN	KAD	01-2020
DESIGNED	KAD	01-2020
CHECKED	EPR	01-2020

REVISIONS / ISSUES			
NO.	DATE	BY	REMARKS



① CROSS SLOPE VARIES THROUGH
PROJECT AS FOLLOWS:

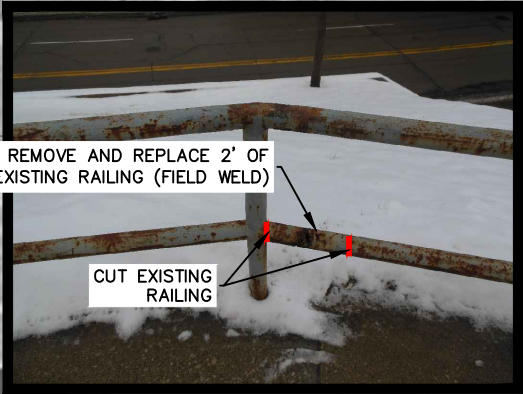
LEFT SIDE		RIGHT SIDE	
STATION 10+50 TO 11+00	- 4.00%	STATION 10+50 TO 11+10	- 4.00%
STATION 11+00 TO 11+20	- 4.00% TO 3.00%	STATION 11+10 TO 11+40	- 4.00% TO 3.00%
STATION 11+20 TO 11+50	- 3.00%	STATION 11+40 TO 11+50	- 3.00%



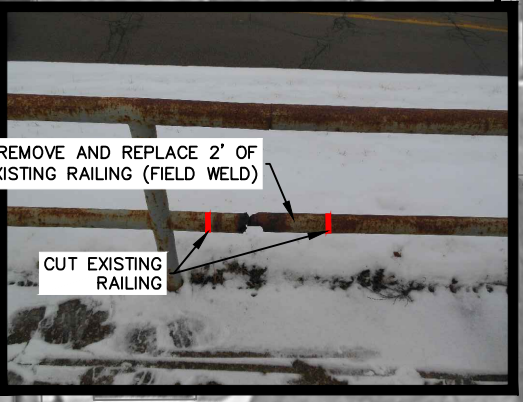
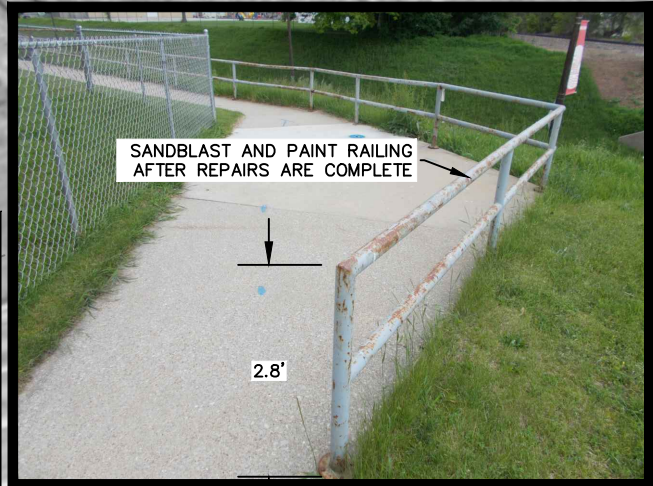
EXISTING 420' DOUBLE RUNG
2" I.D. STEEL RAILING
WITH 58 POSTS 2.8' TALL



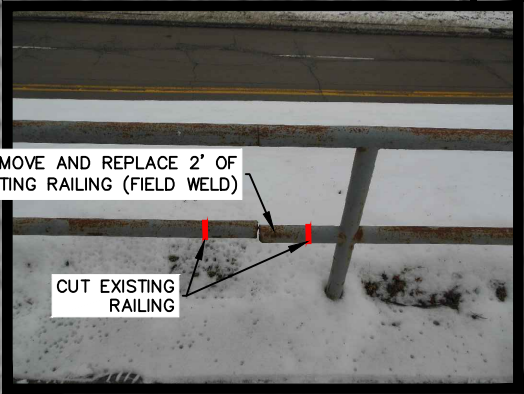
REMOVE AND REPLACE 2' OF
EXISTING RAILING (FIELD WELD)
WITH 2' OF 1.5" O.D. STEEL PIPE INSIDE



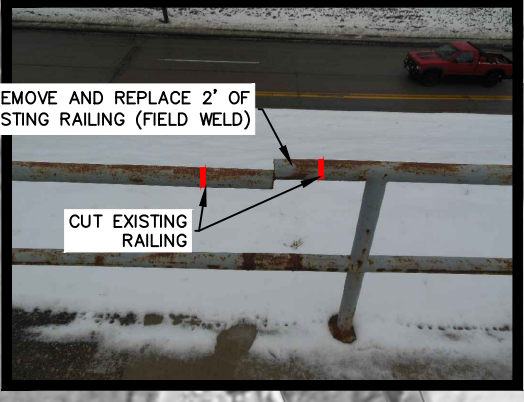
REMOVE AND REPLACE 2' OF
EXISTING RAILING (FIELD WELD)



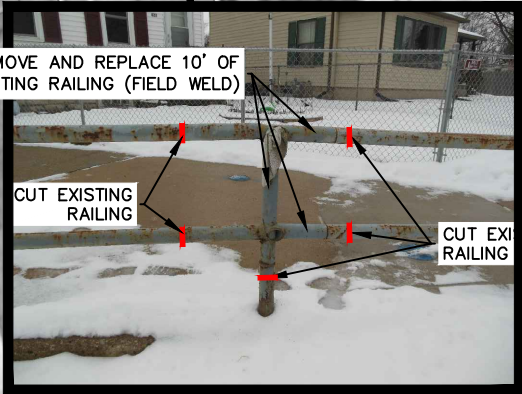
REMOVE AND REPLACE 2' OF
EXISTING RAILING (FIELD WELD)



REMOVE AND REPLACE 2' OF
EXISTING RAILING (FIELD WELD)



REMOVE AND REPLACE 2' OF
EXISTING RAILING (FIELD WELD)



REMOVE AND REPLACE 10' OF
EXISTING RAILING (FIELD WELD)



CITY OF DE PERE

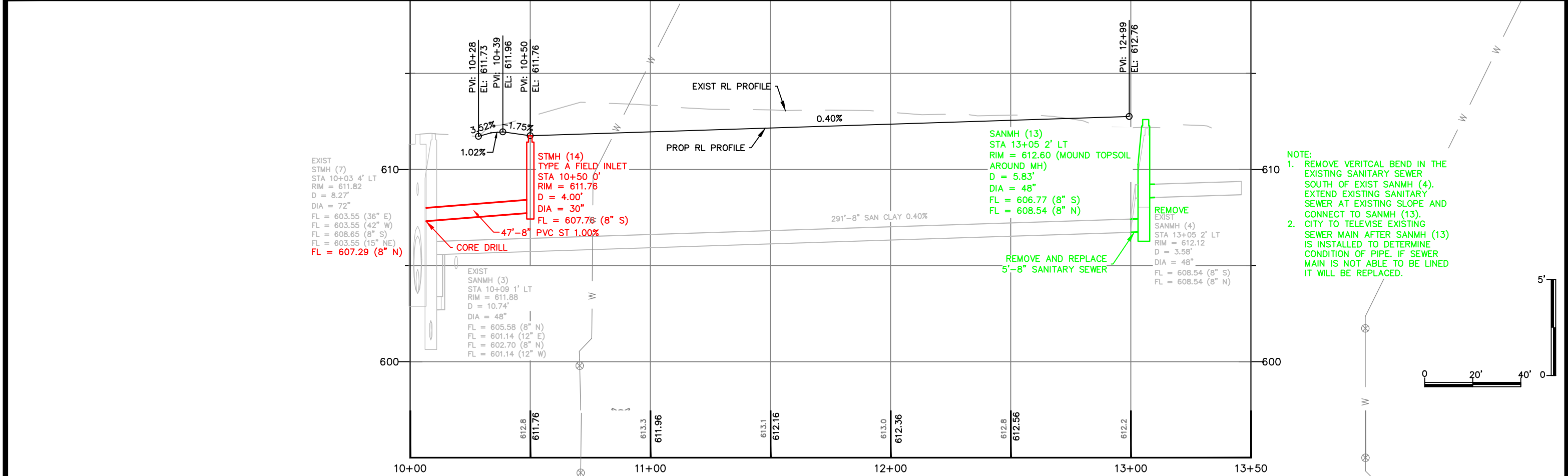
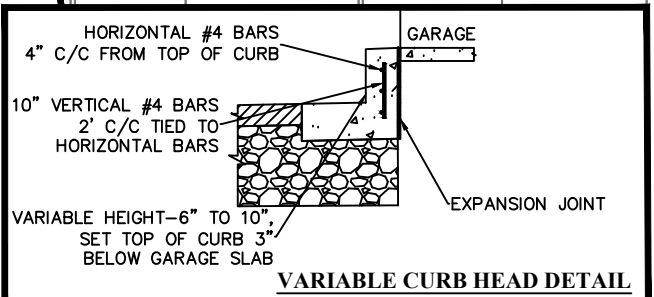
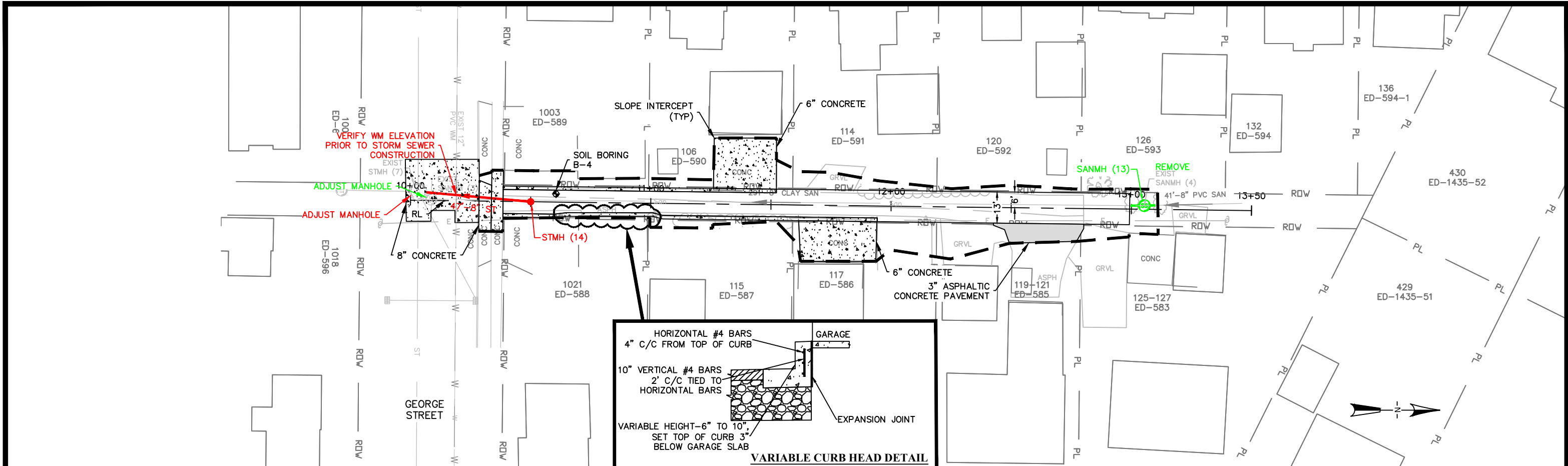
ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

**MAIN AVENUE
RAILING REPAIR**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

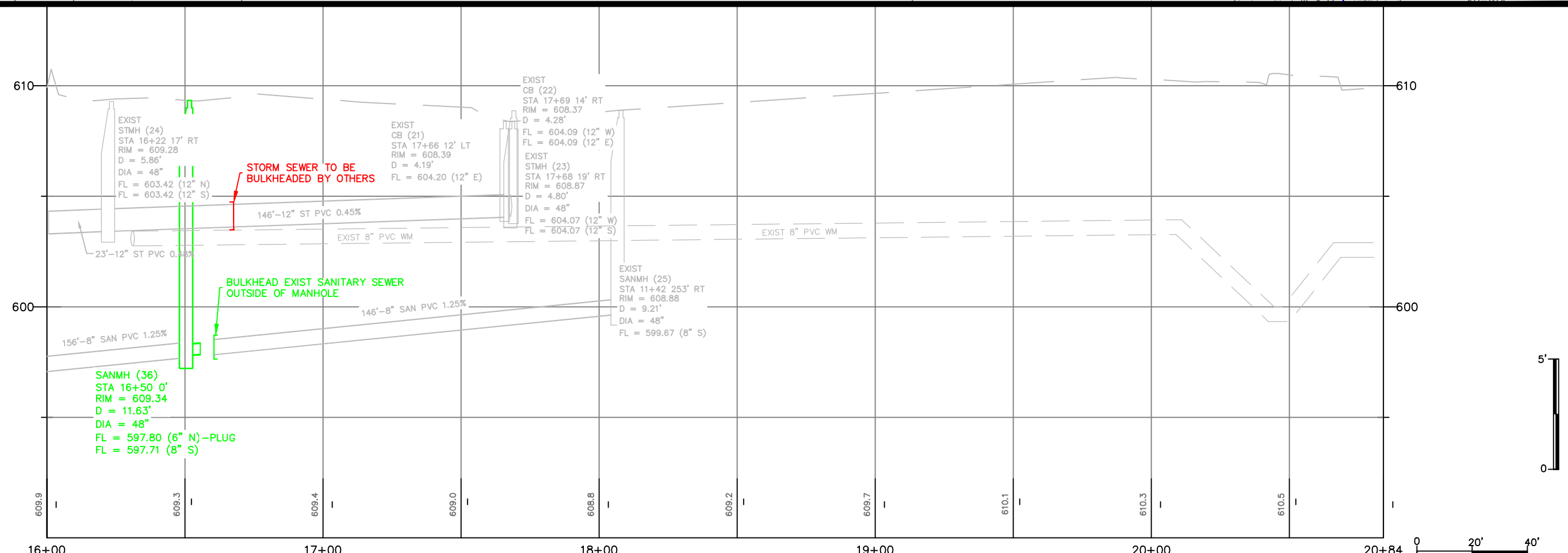
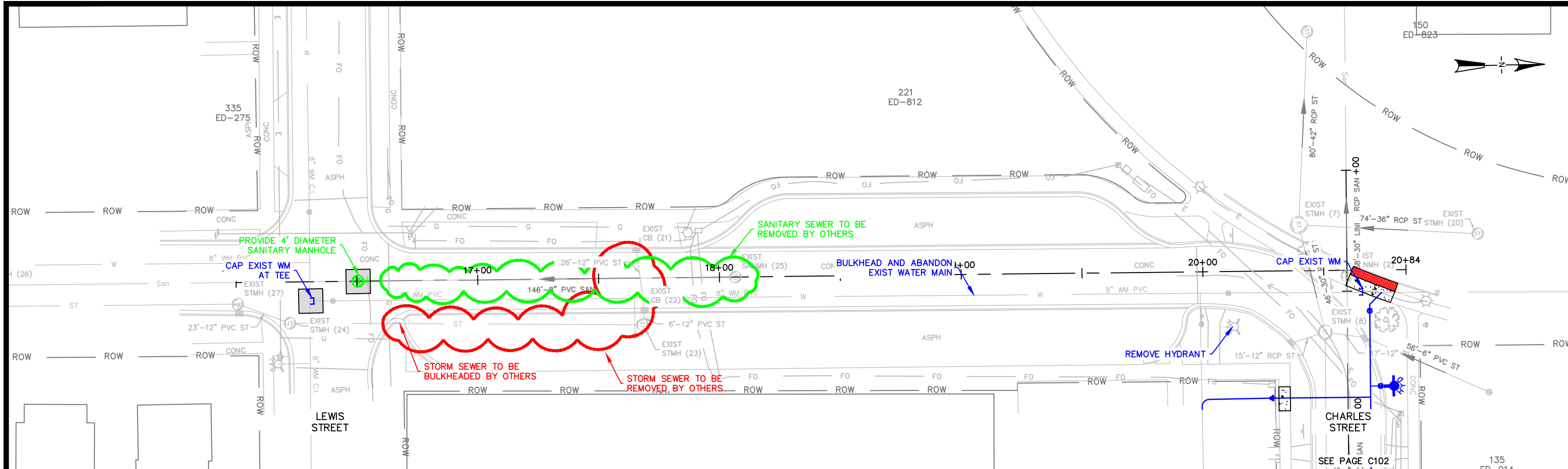
	BY	DATE
SURVEYED	KAD	01-2020
DRAWN	KAD	01-2020
CHECKED	EPR	01-2020

REVISIONS / ISSUES		
NO.	DATE	REMARKS



NOTE:

- REMOVE VERTICAL BEND IN THE EXISTING SANITARY SEWER SOUTH OF EXIST SANMH (4). EXTEND EXISTING SANITARY SEWER AT EXISTING SLOPE AND CONNECT TO SANMH (13).
- CITY TO TELEWISE EXISTING SEWER MAIN AFTER SANMH (13) IS INSTALLED TO DETERMINE CONDITION OF PIPE. IF SEWER MAIN IS NOT ABLE TO BE LINED IT WILL BE REPLACED.



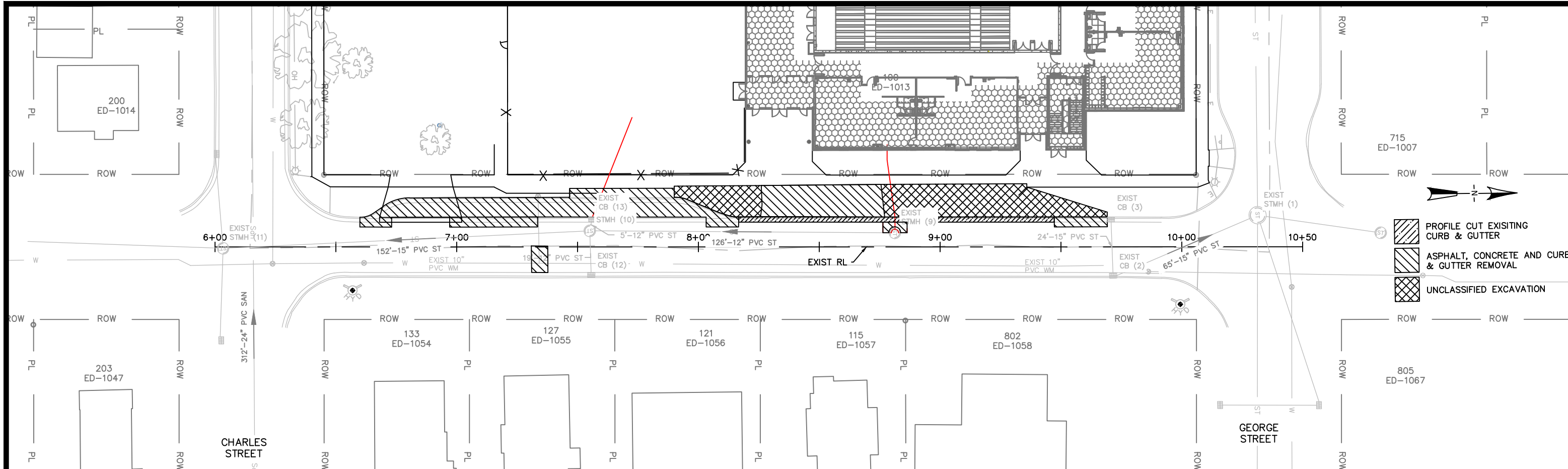
CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071




**SOUTH WISCONSIN STREET
 LEWIS STREET TO CHARLES STREET
 UTILITY ABANDONMENT**

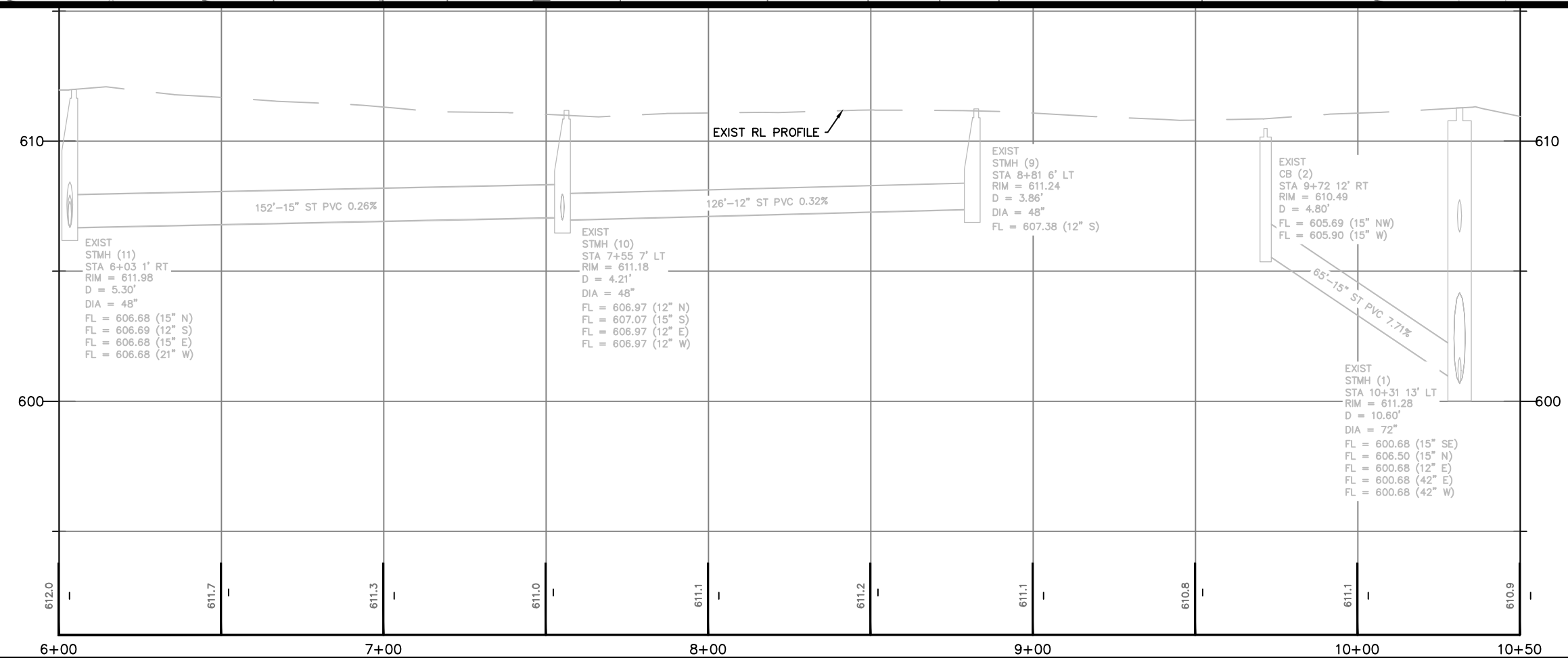
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

	BY	DATE	REVISIONS / ISSUES	
			NO.	DATE
SURVEYED	KAD	01-2020		
DRAWN	KAD	01-2020		
DESIGNED	KAD	01-2020		
CHECKED	EPR	01-2020		

X:\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Charles Street\CHARLES_P&P.dwg

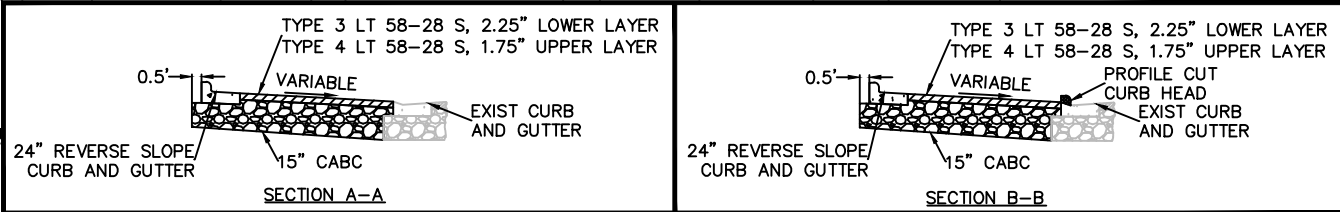
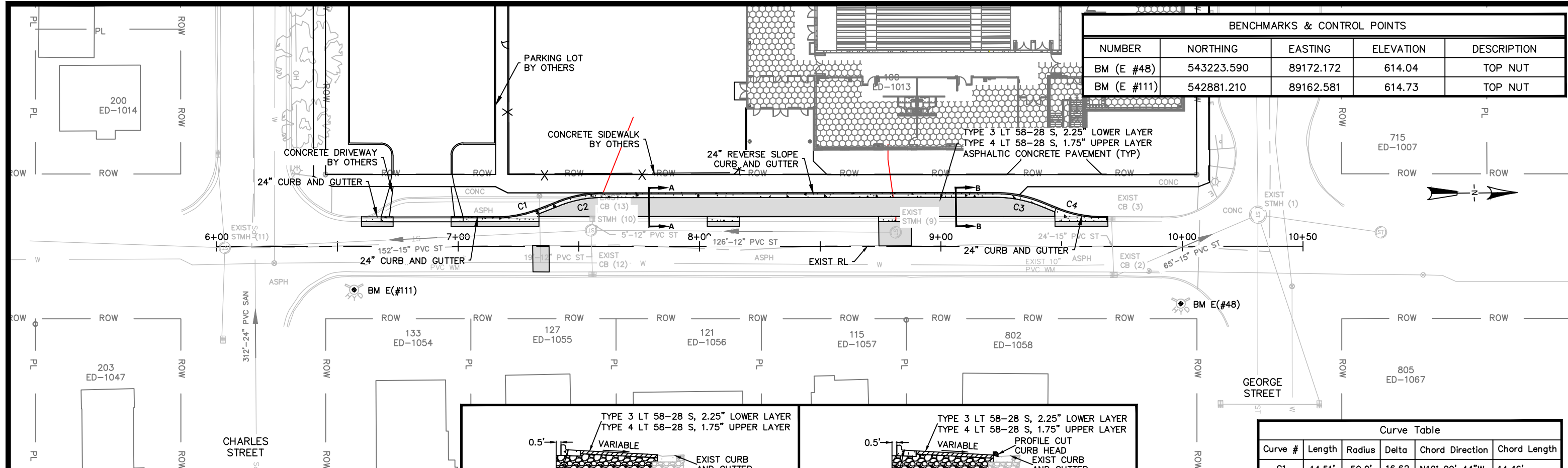


-  PROFILE CUT EXISTING CURB & GUTTER
-  ASPHALT, CONCRETE AND CURB & GUTTER REMOVAL
-  UNCLASSIFIED EXCAVATION

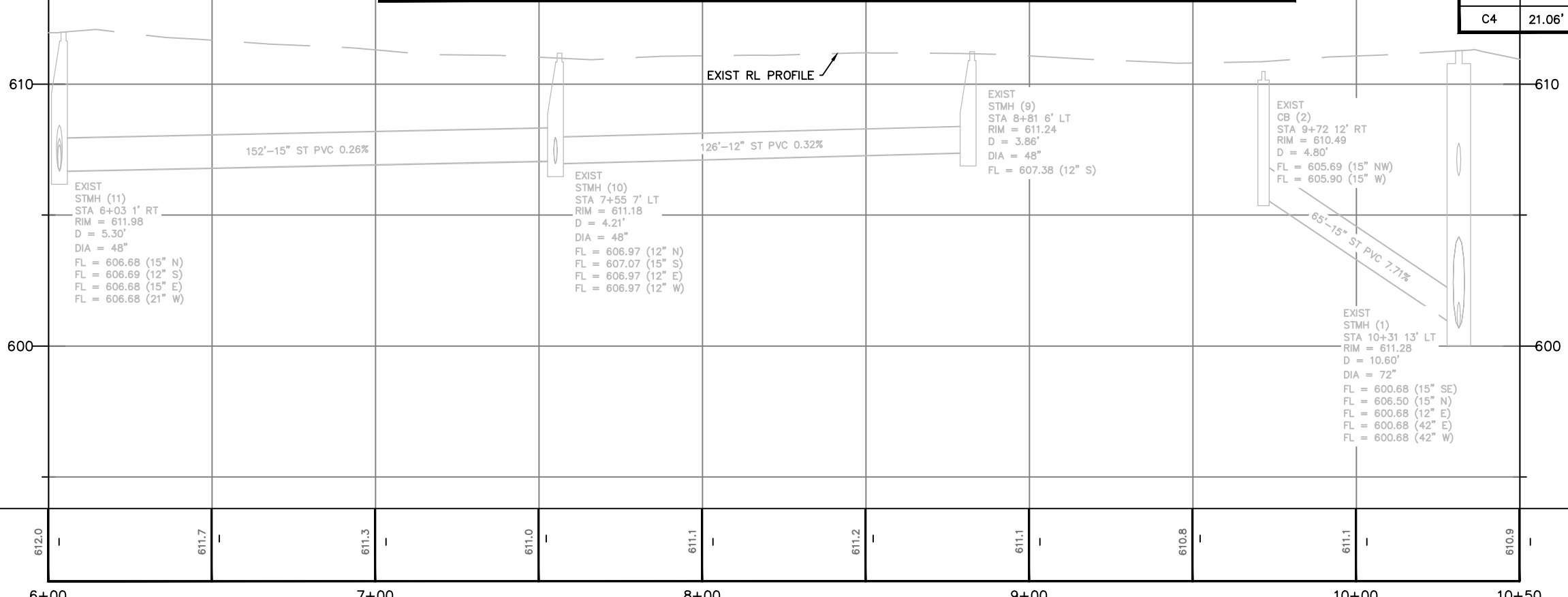


X:\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\200-CAD\Huron Street\Huron_LP.dwg

BENCHMARKS & CONTROL POINTS				
NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM (E #48)	543223.590	89172.172	614.04	TOP NUT
BM (E #111)	542881.210	89162.581	614.73	TOP NUT

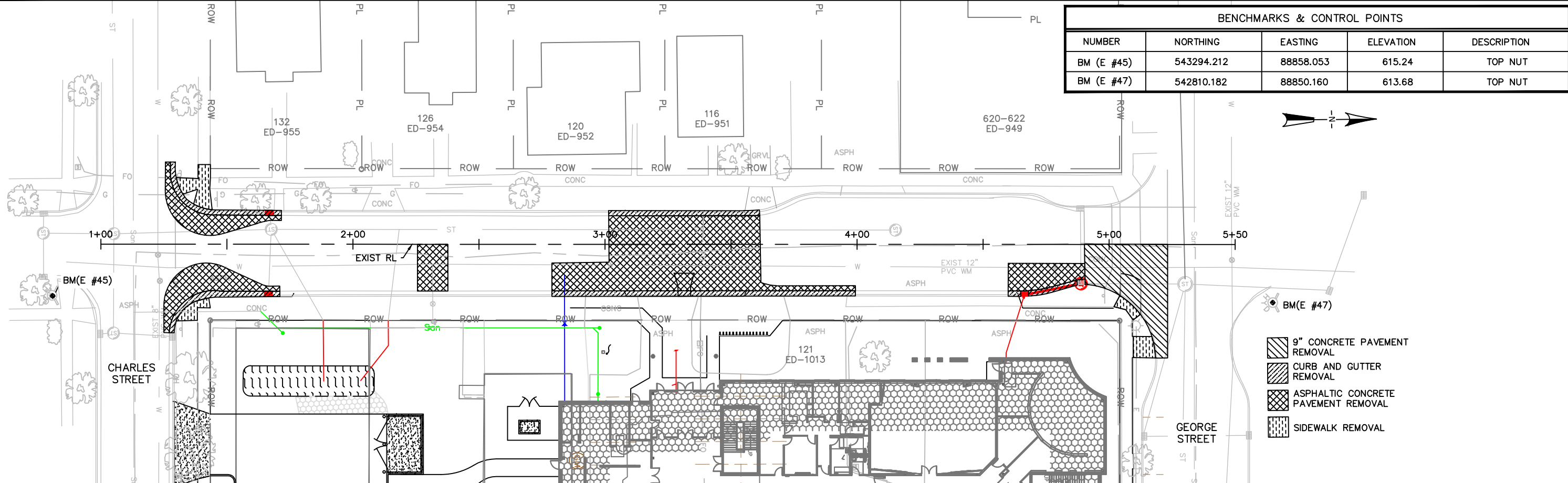


Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	14.51'	50.0'	16.62	N12° 09' 44\"W	14.46'
C2	17.94'	48.5'	21.19	S9° 59' 10\"E	17.84'
C3	18.63'	48.5'	22.01	S11° 36' 51\"W	18.52'
C4	21.06'	50.9'	23.72	N10° 30' 52\"E	20.91'

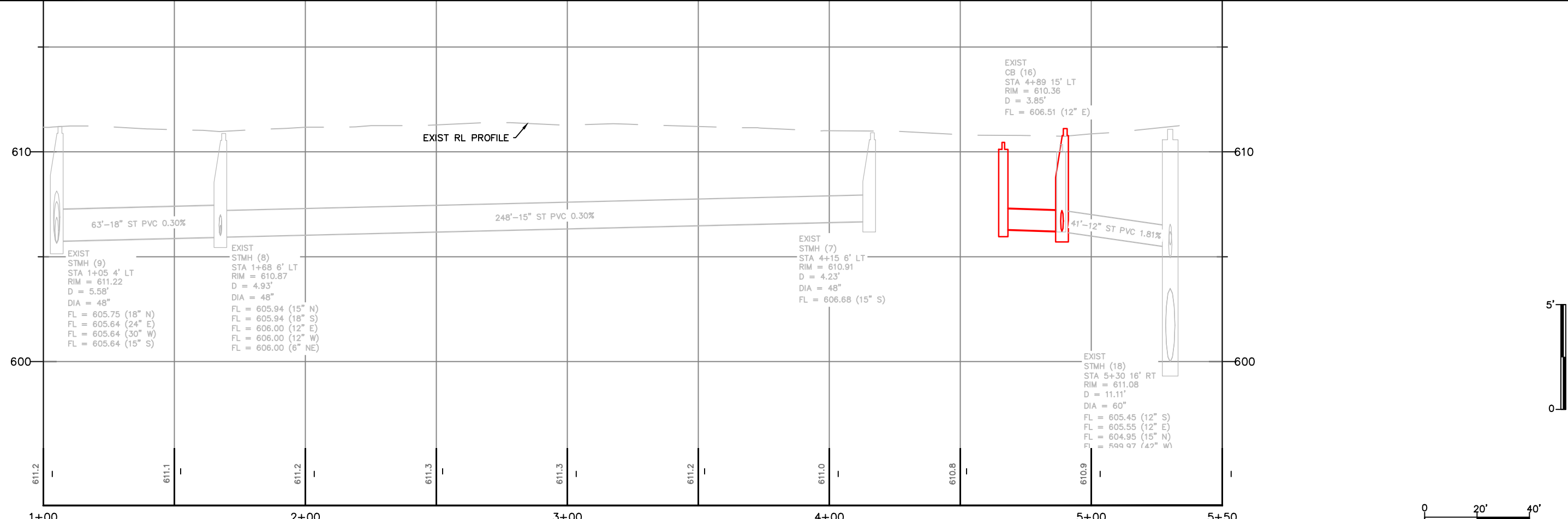


X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Huron Street\HURON_LP.dwg

BENCHMARKS & CONTROL POINTS				
NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM (E #45)	543294.212	88858.053	615.24	TOP NUT
BM (E #47)	542810.182	88850.160	613.68	TOP NUT



- 9" CONCRETE PAVEMENT REMOVAL
- CURB AND GUTTER REMOVAL
- ASPHALTIC CONCRETE PAVEMENT REMOVAL
- SIDEWALK REMOVAL



CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

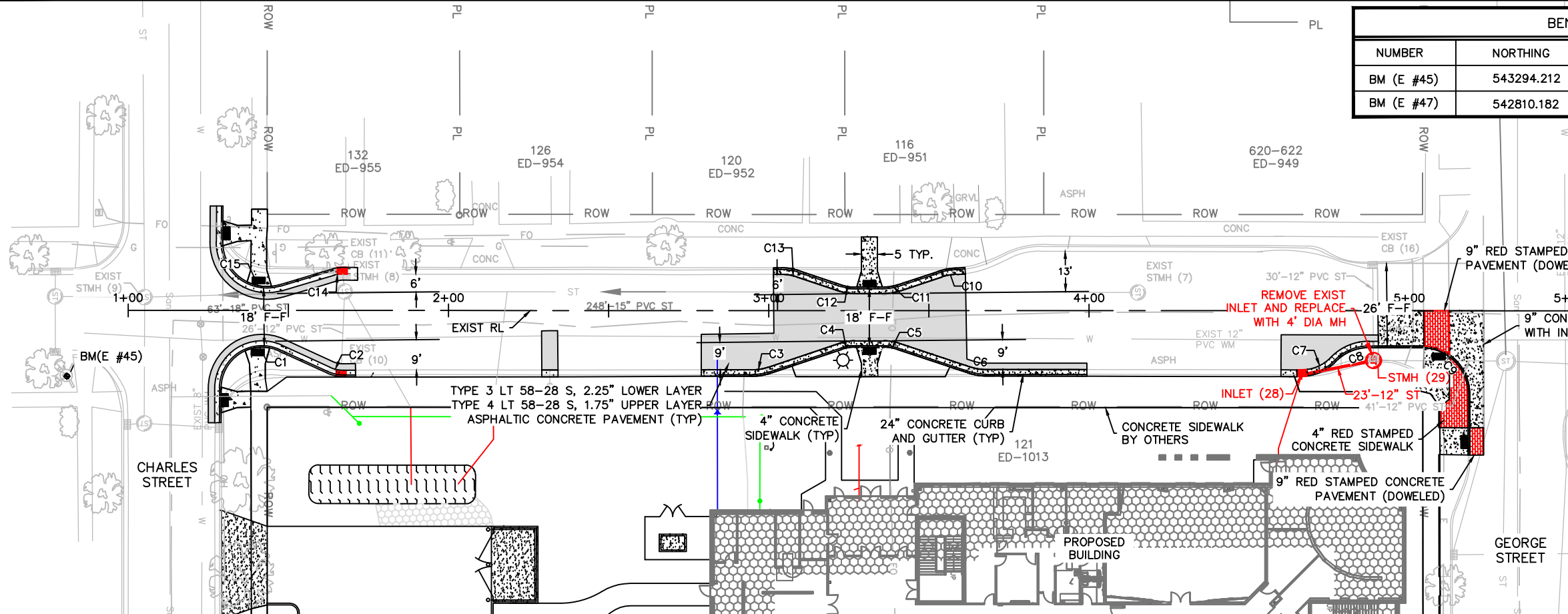
**SOUTH SUPERIOR STREET
 CHARLES STREET TO GEORGE STREET
 DEMOLITION PLAN**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

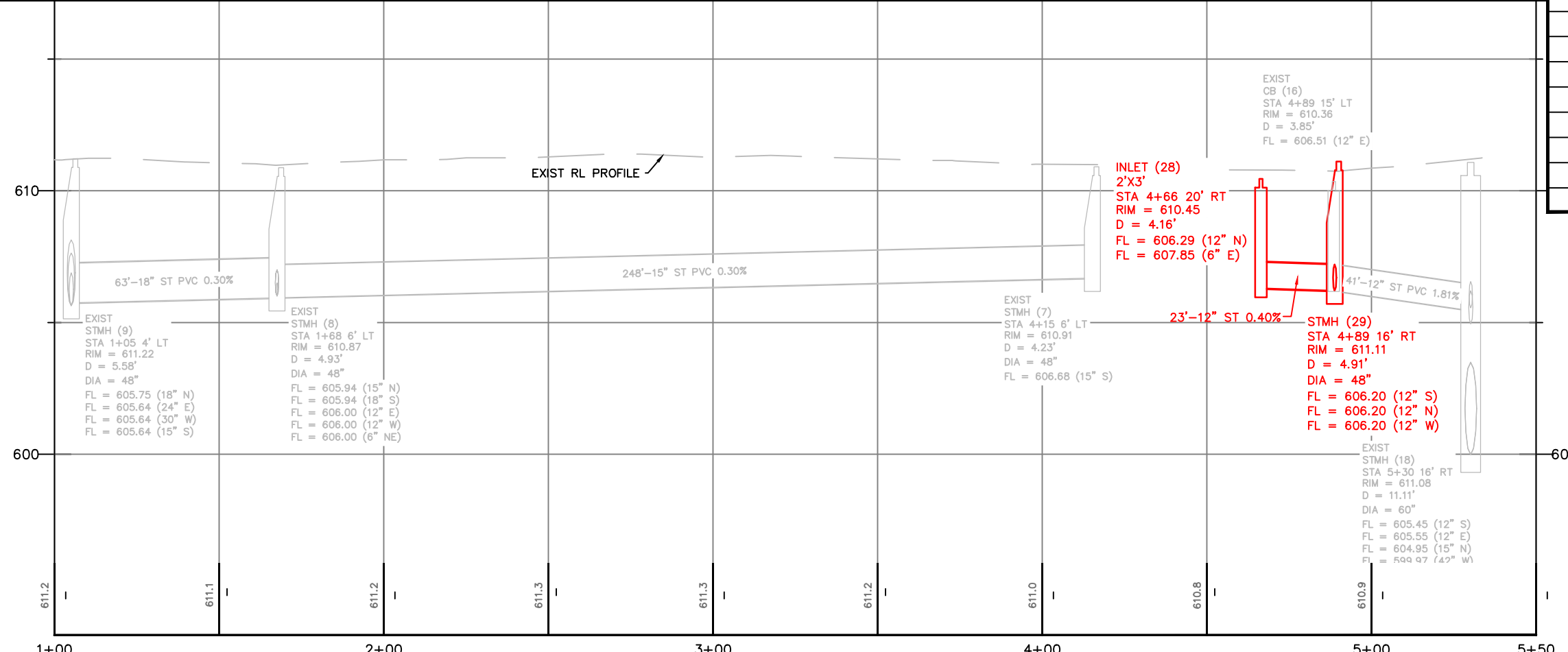
NO.	DATE	REVISIONS / ISSUES	
		BY	REMARKS
SURVEYED	05-2019	IGS	
DRAWN	11-2019	KAD	
DESIGNED	11-2019	KAD	
CHECKED	11-2019	EPR	

X:\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Superior Street\SUPERIOR_P&P.dwg

BENCHMARKS & CONTROL POINTS				
NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM (E #45)	543294.212	88858.053	615.24	TOP NUT
BM (E #47)	542810.182	88850.160	613.68	TOP NUT



Curve Table					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	25.56	12.80	114.40	S32° 02' 09"E	21.52
C2	4.36	10.00	25.00	S12° 39' 51"W	4.33
C3	4.83	15.00	18.43	N8° 38' 05"W	4.81
C4	4.18	13.00	18.43	S8° 38' 05"E	4.16
C5	4.18	13.00	18.43	S9° 48' 01"W	4.16
C6	4.83	15.00	18.43	N9° 48' 01"E	4.81
C7	8.45	12.50	38.73	N26° 11' 32"W	8.29
C8	11.69	14.50	46.19	S22° 27' 38"E	11.38
C9	21.78	14.46	86.29	S45° 40' 26"W	19.78
C10	4.83	15.00	18.44	N8° 35' 01"W	4.81
C11	4.18	13.00	18.44	S8° 35' 01"E	4.16
C12	4.18	13.00	18.43	S9° 51' 05"W	4.16
C13	4.83	15.00	18.43	N9° 51' 05"E	4.81
C14	2.97	10.00	17.03	S7° 27' 49"E	2.96
C15	25.77	13.80	106.98	S37° 30' 38"W	22.18



CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

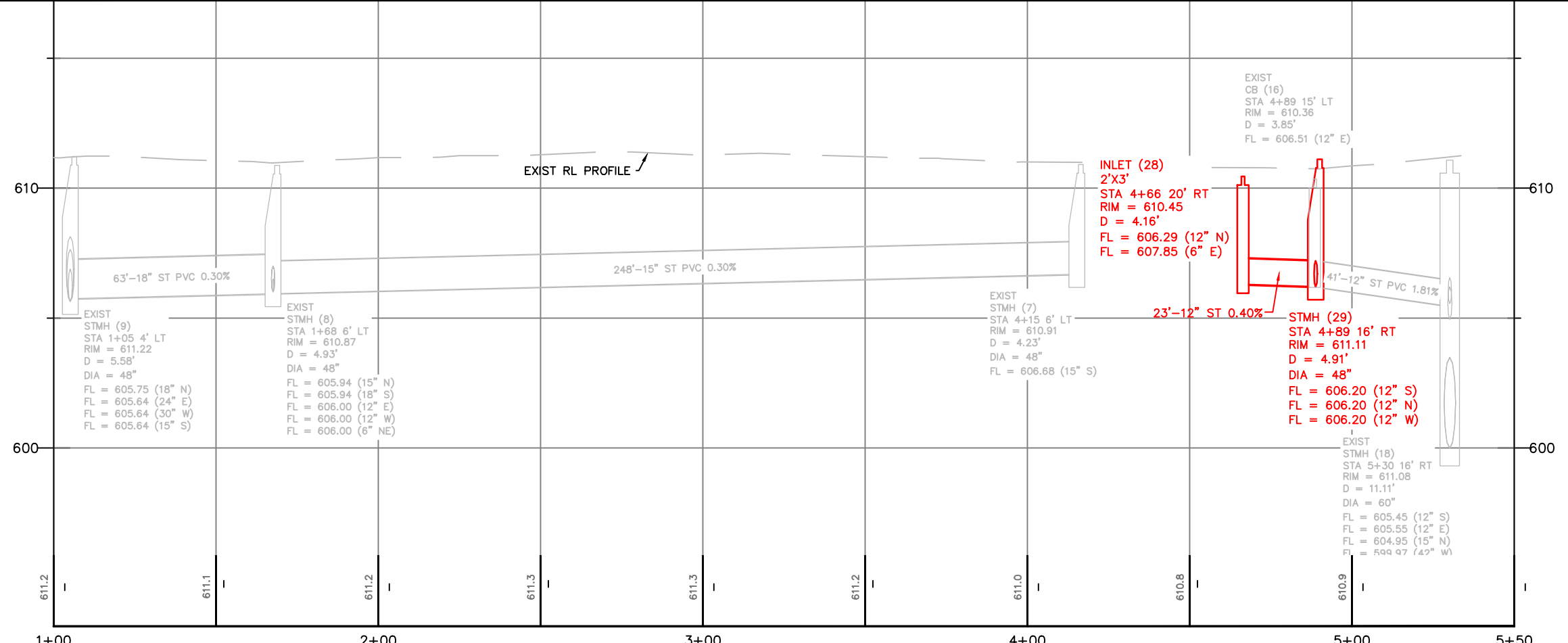
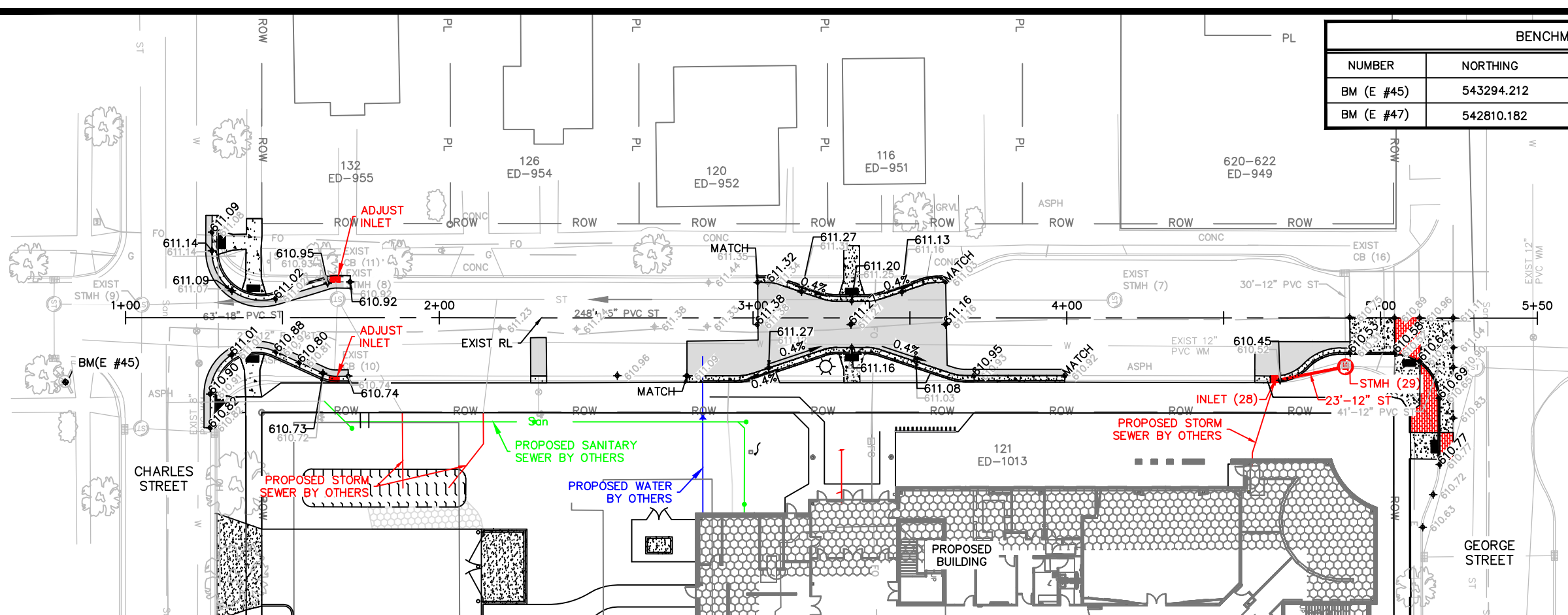
**SOUTH SUPERIOR STREET
 CHARLES STREET TO GEORGE STREET
 STORM AND STREET IMPROVEMENTS**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02

NO.	DATE	REVISIONS / ISSUES	
		BY	REMARKS
1	05-2019	IGS	SURVEYED
2	11-2019	KAD	DRAWN
3	11-2019	KAD	DESIGNED
4	11-2019	EPR	CHECKED

x:\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Superior Street Reconstruction\SUPERIOR_P&P.dwg

BENCHMARKS & CONTROL POINTS				
NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
BM (E #45)	543294.212	88858.053	615.24	TOP NUT
BM (E #47)	542810.182	88850.160	613.68	TOP NUT



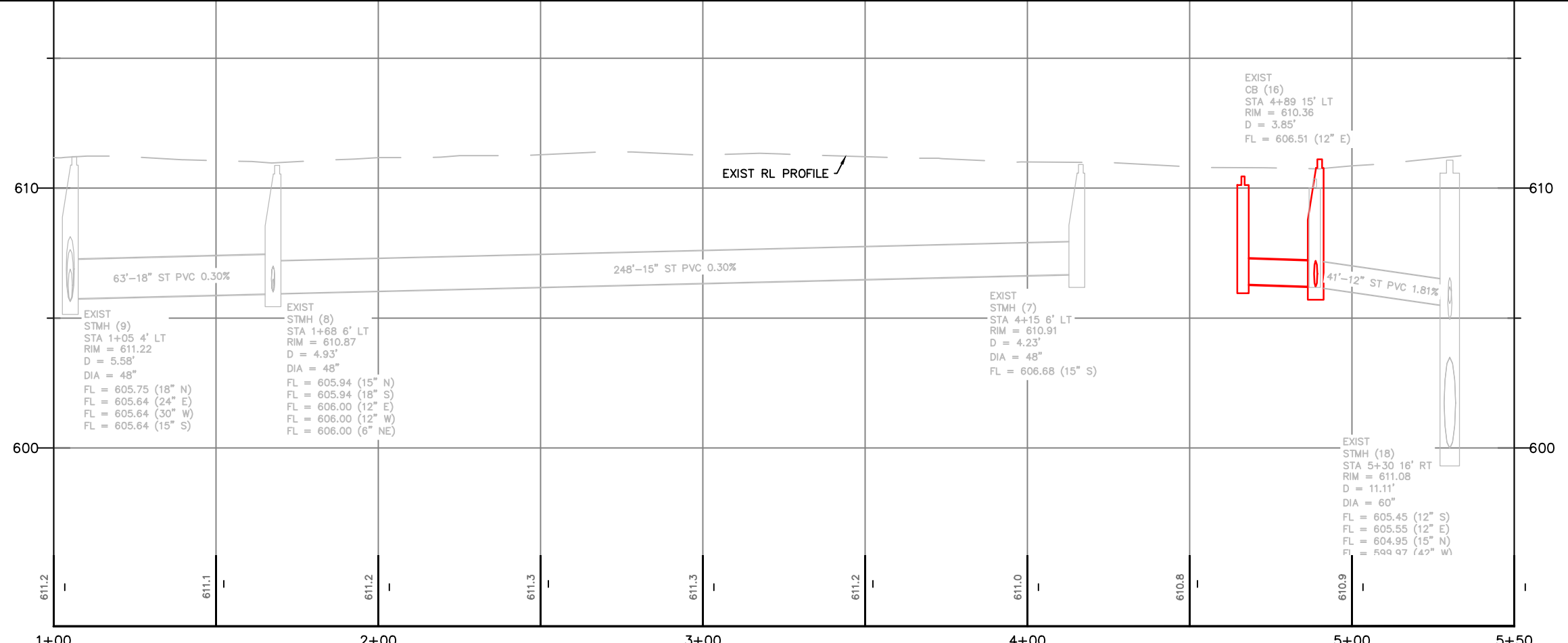
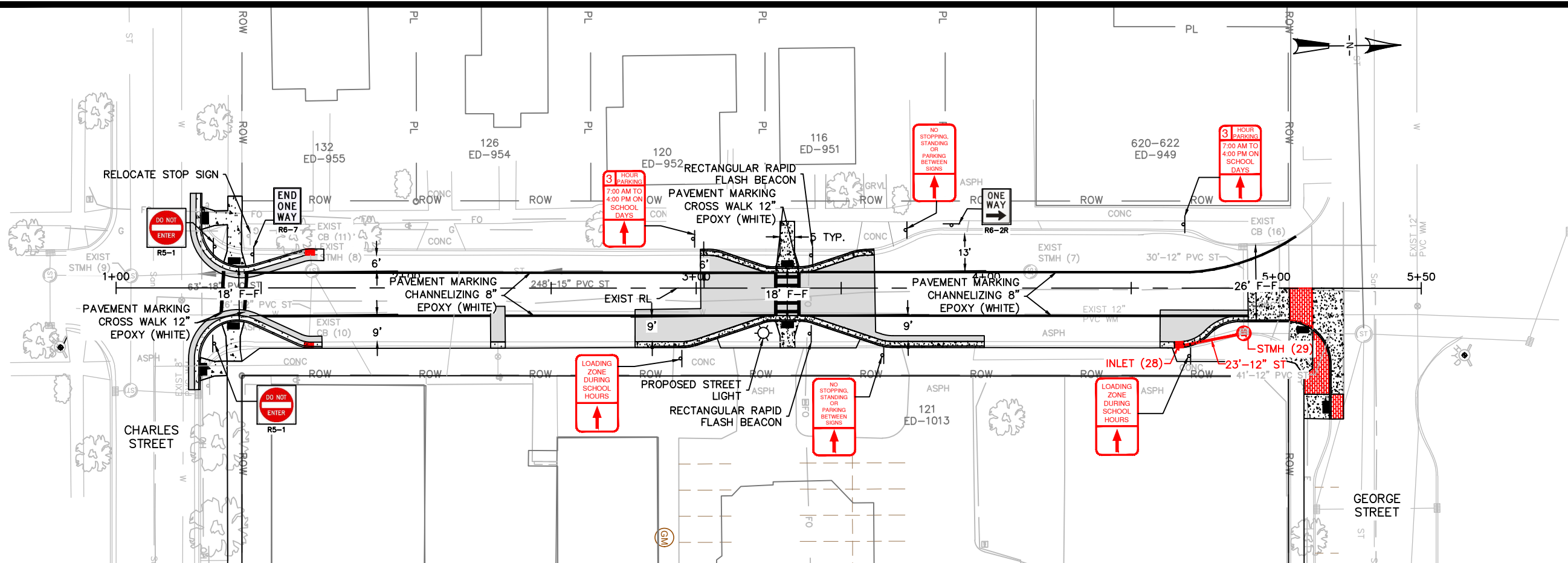
CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

**SOUTH SUPERIOR STREET
 CHARLES STREET TO GEORGE STREET
 GRADING AND UTILITY PLAN**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

NO.	DATE	REVISIONS / ISSUES	
		BY	REMARKS
1	05-2019	IGS	SURVEYED
2	11-2019	KAD	DRAWN
3	11-2019	KAD	DESIGNED
4	11-2019	EPR	CHECKED

X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Superior Street Reconstruction\SUPERIOR_P&P.dwg



CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

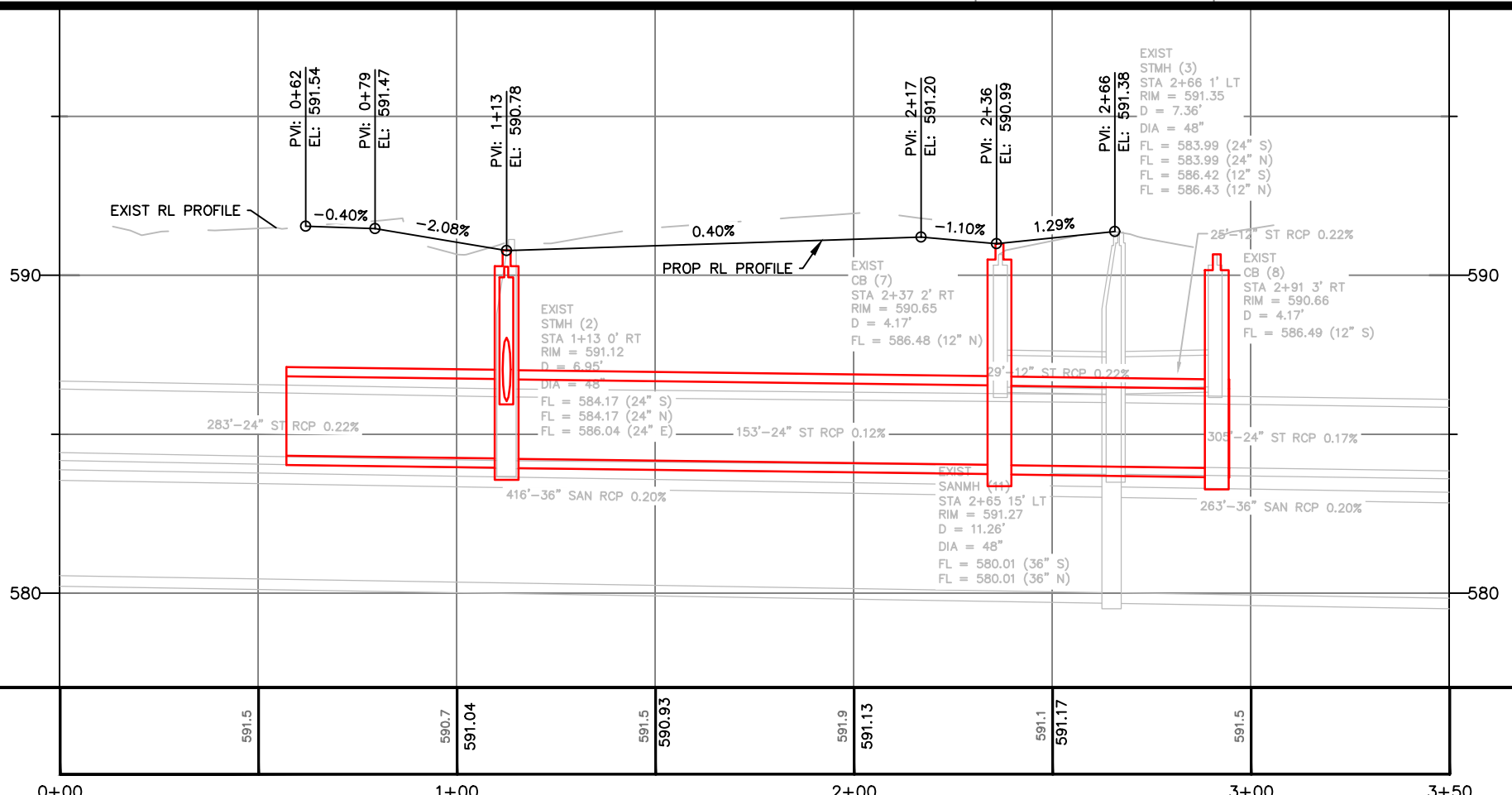
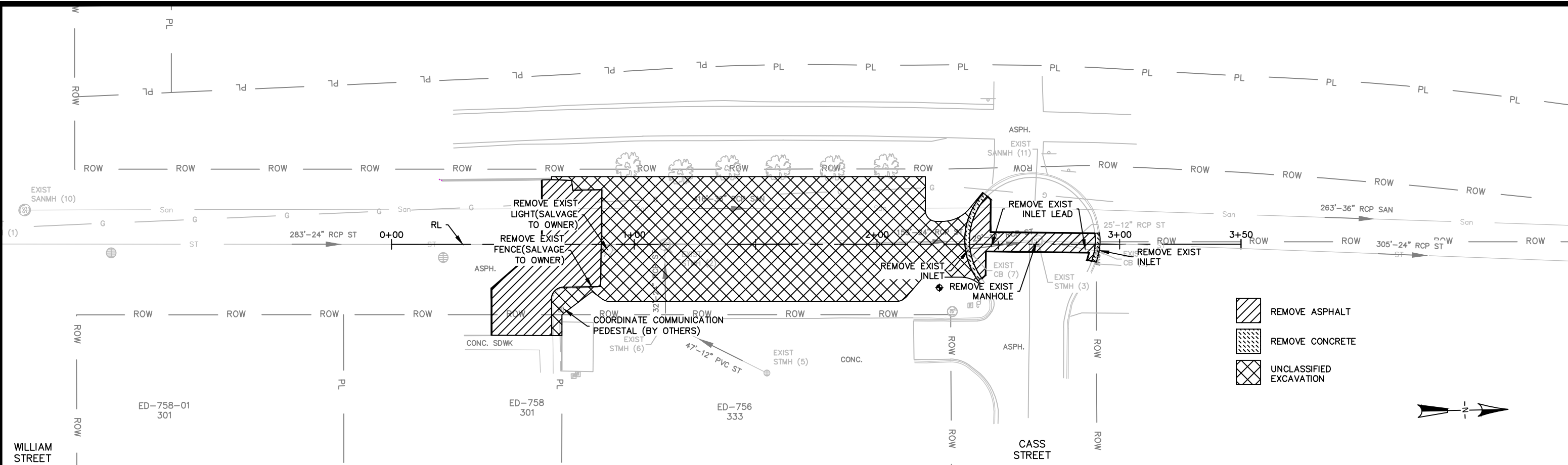
**SOUTH SUPERIOR STREET
 CHARLES STREET TO GEORGE STREET
 PAVEMENT MARKING AND SIGNAGE PLAN**

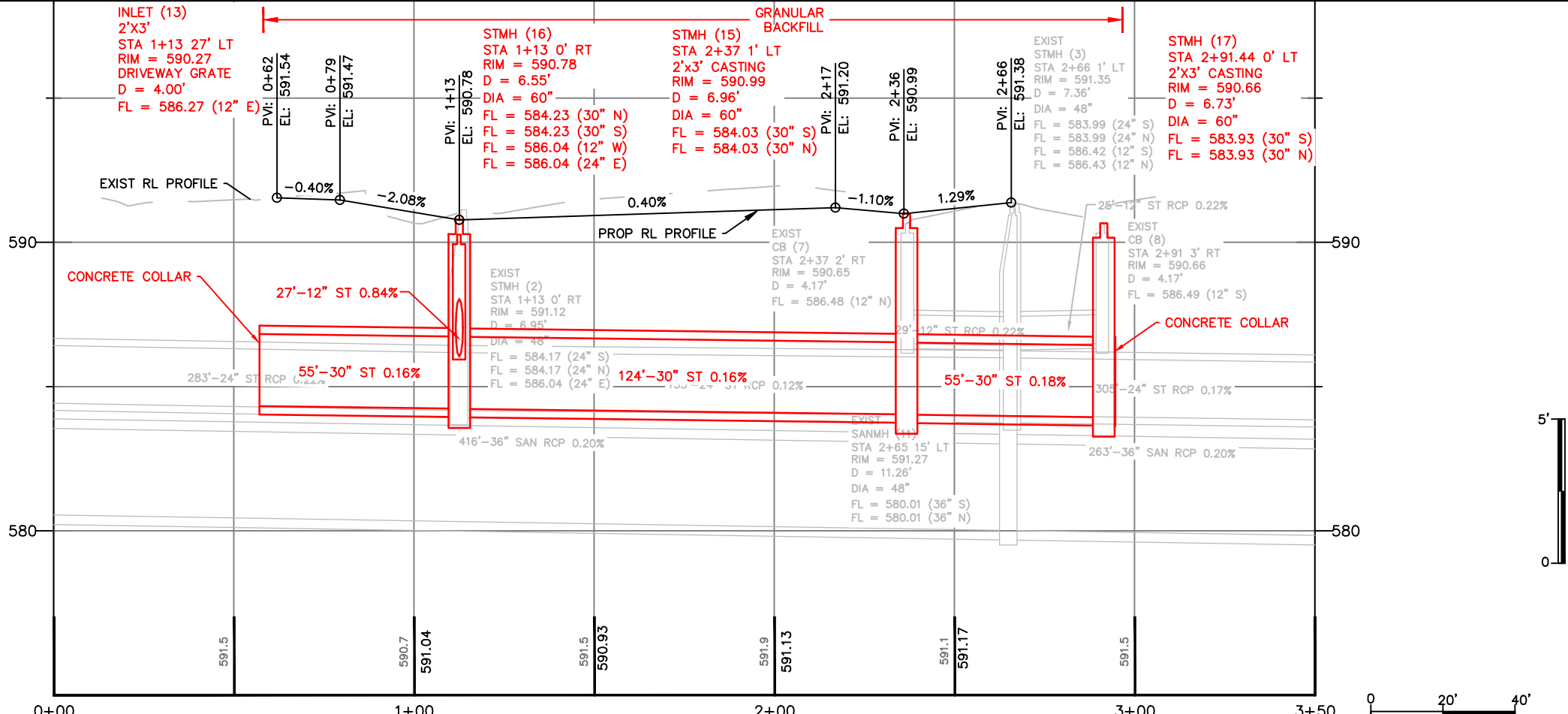
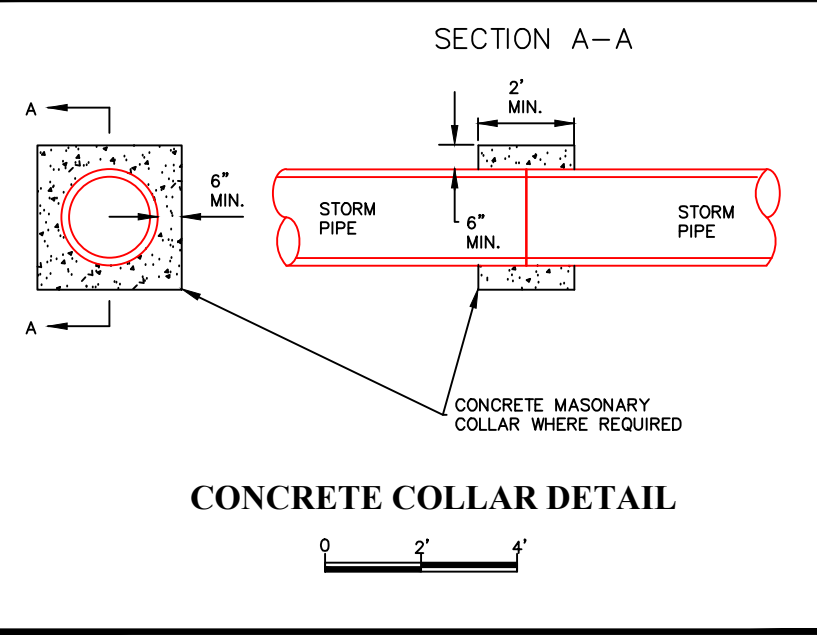
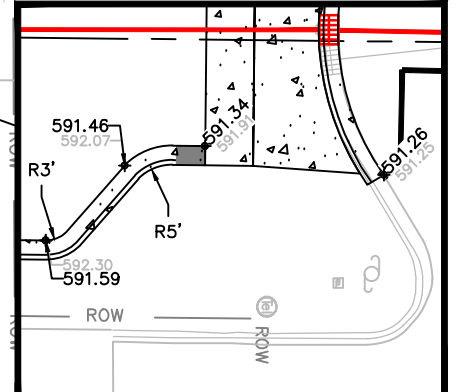
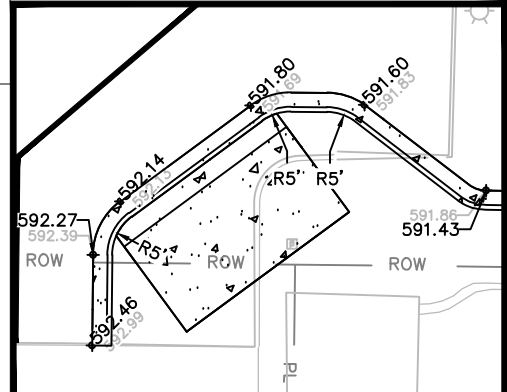
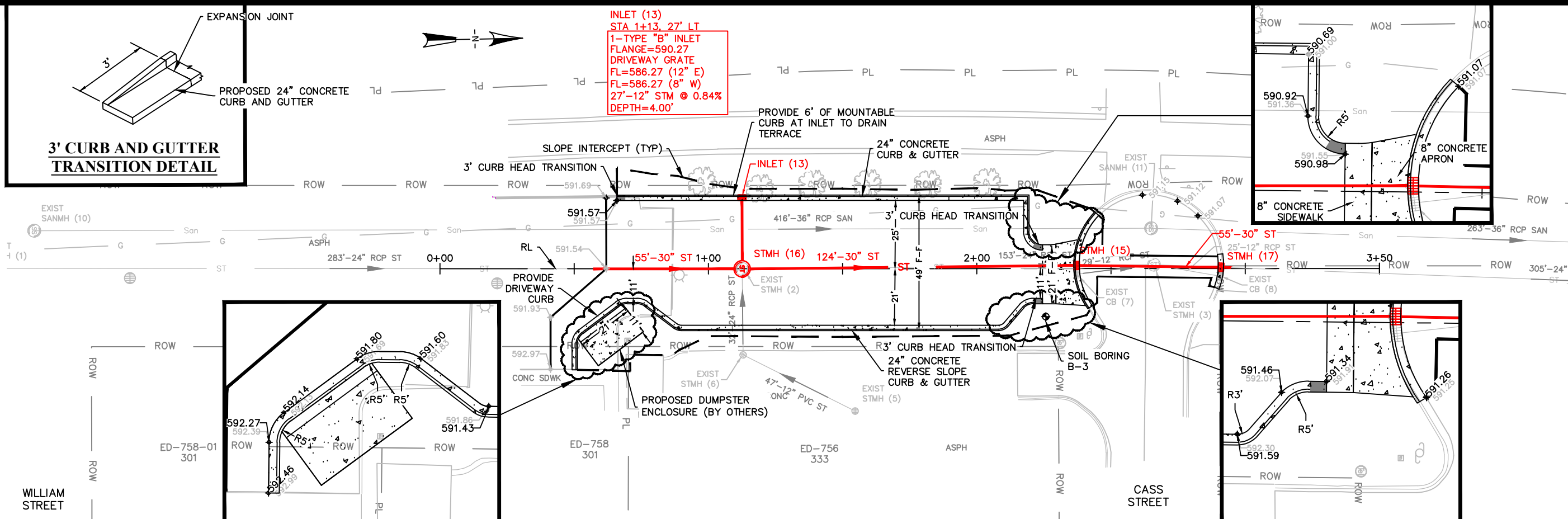
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

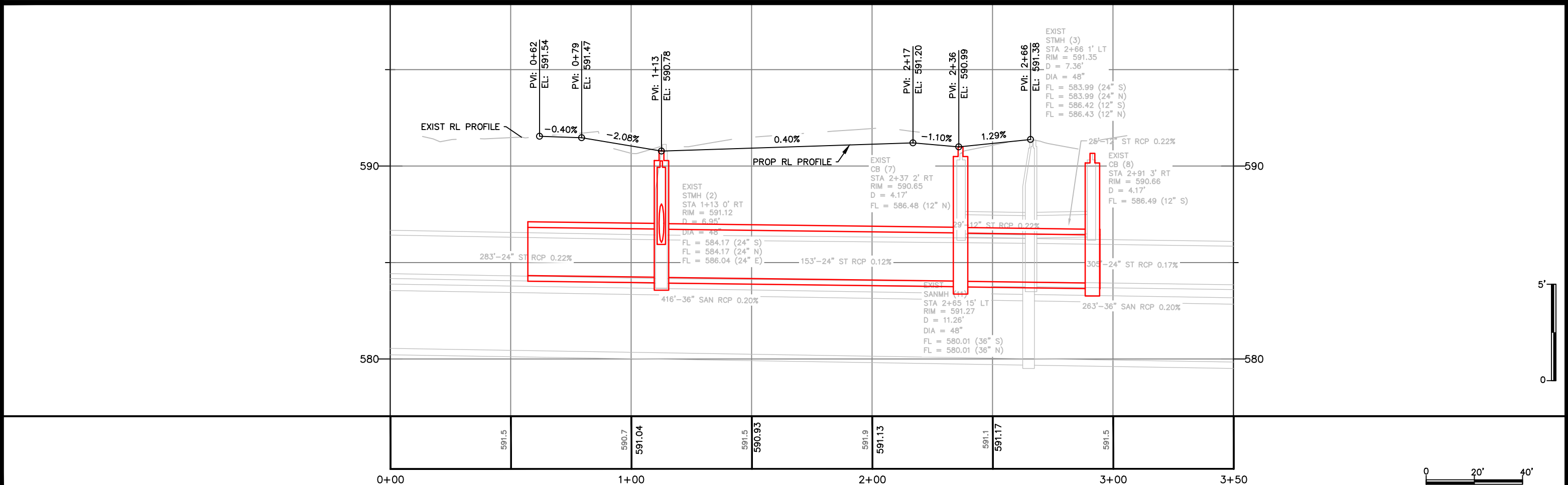
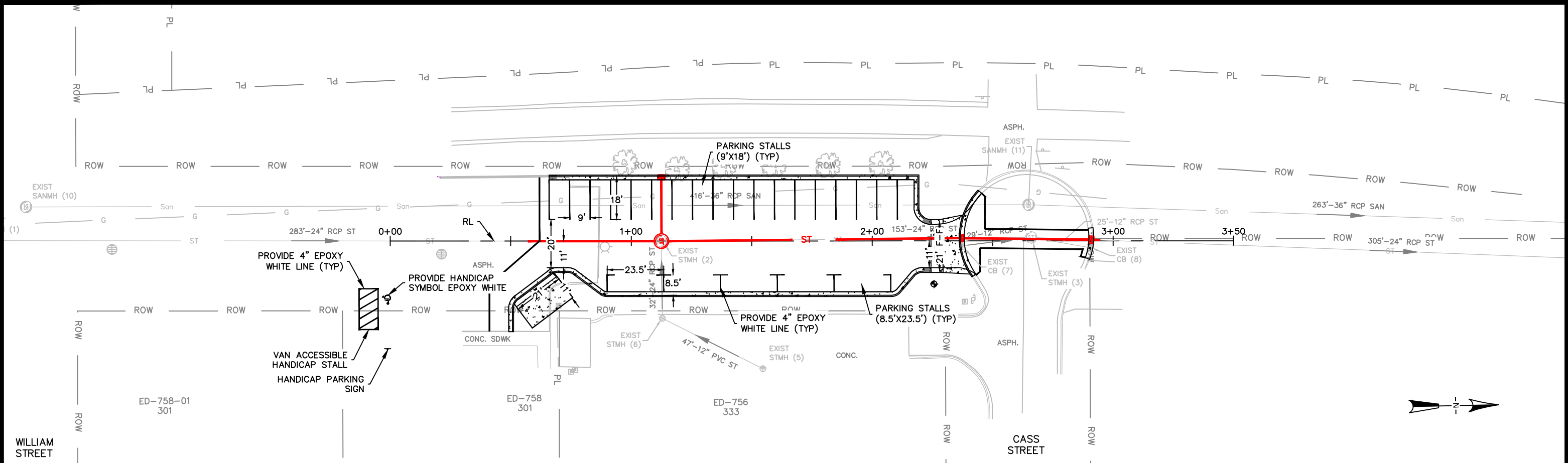
BY	DATE
SURVEYED IGS	05-2019
DRAWN KAD	11-2019
DESIGNED KAD	11-2019
CHECKED EPR	11-2019

REVISIONS / ISSUES		
NO.	DATE	REMARKS

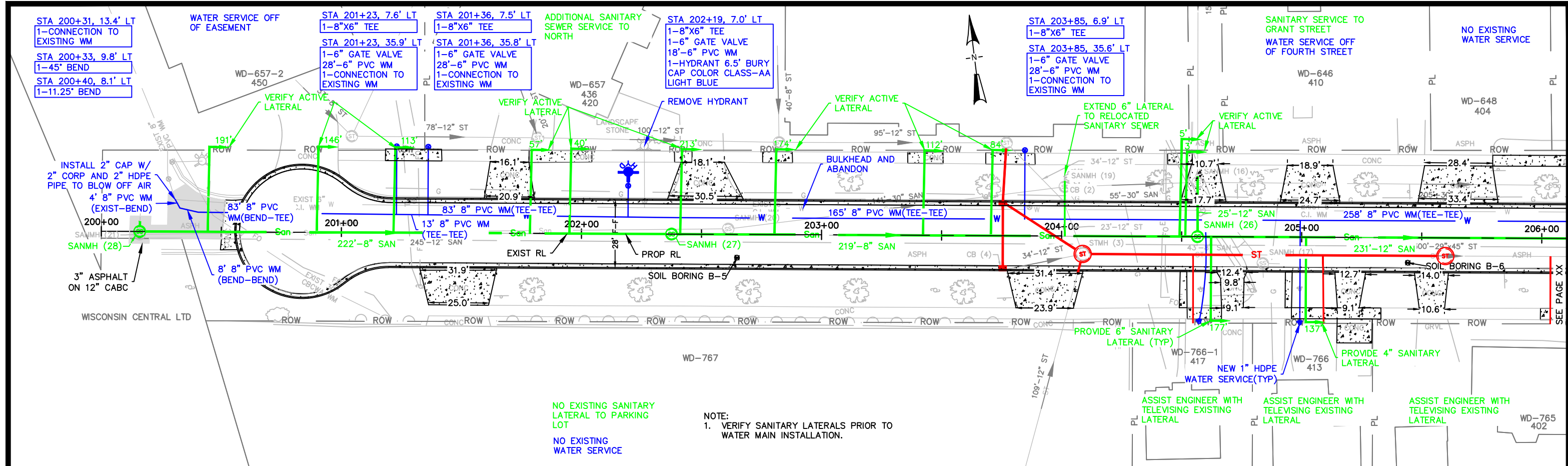
x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Superior Street\SUPERIOR_P&P.dwg



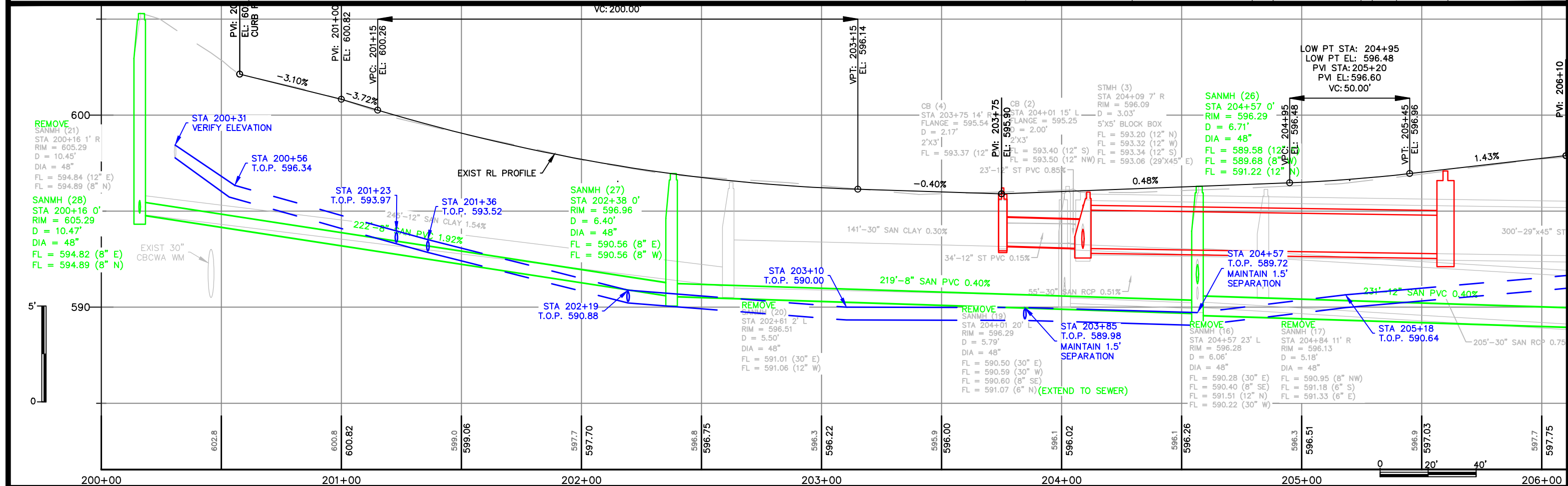


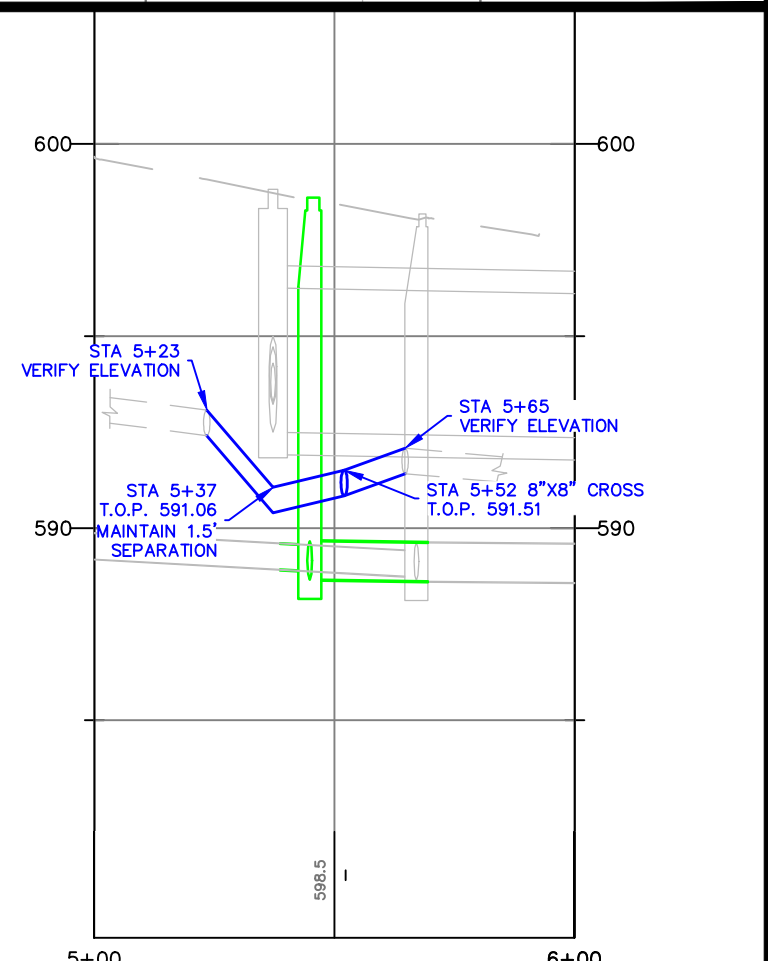
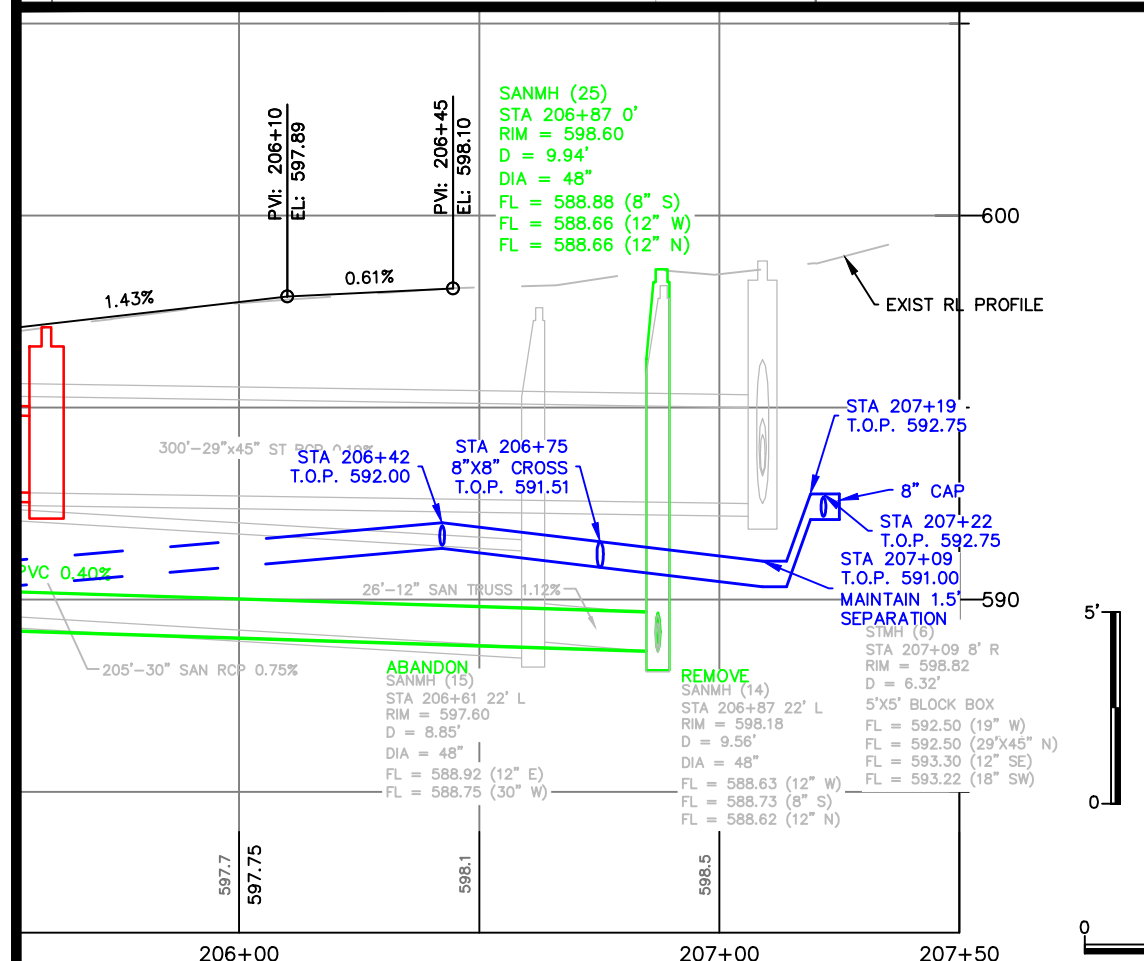
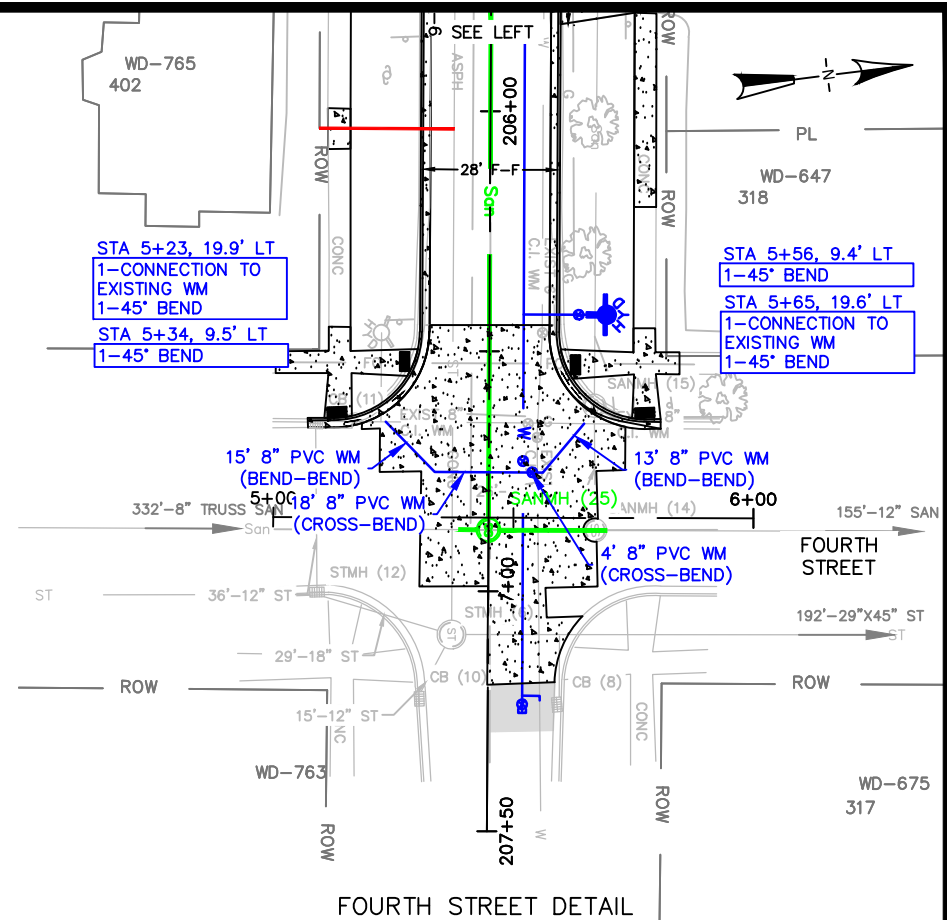
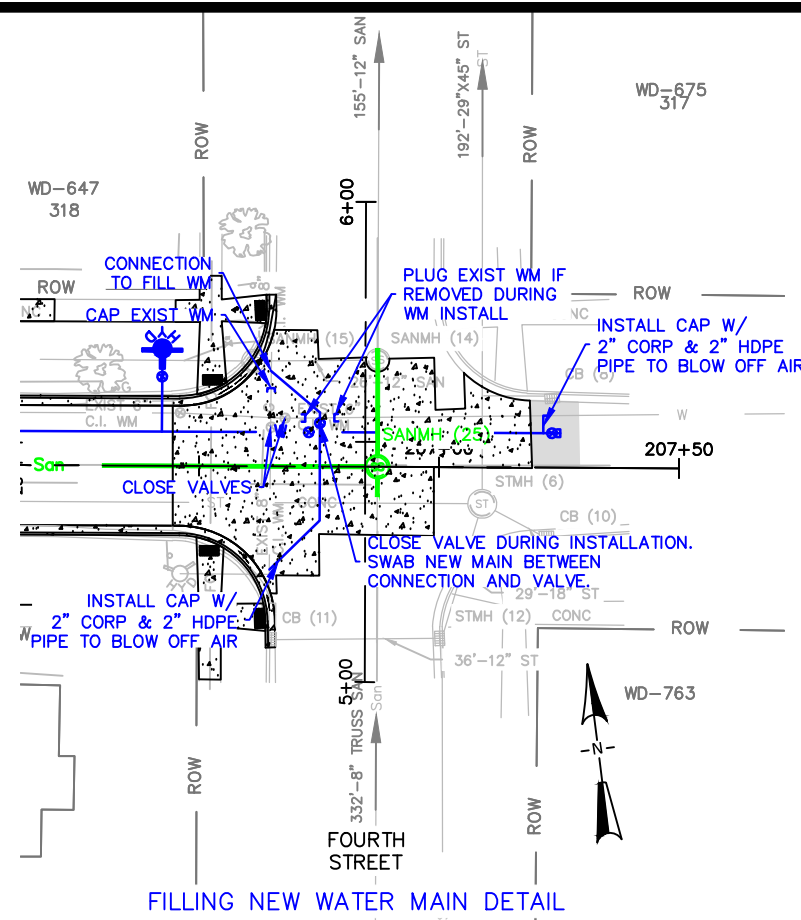
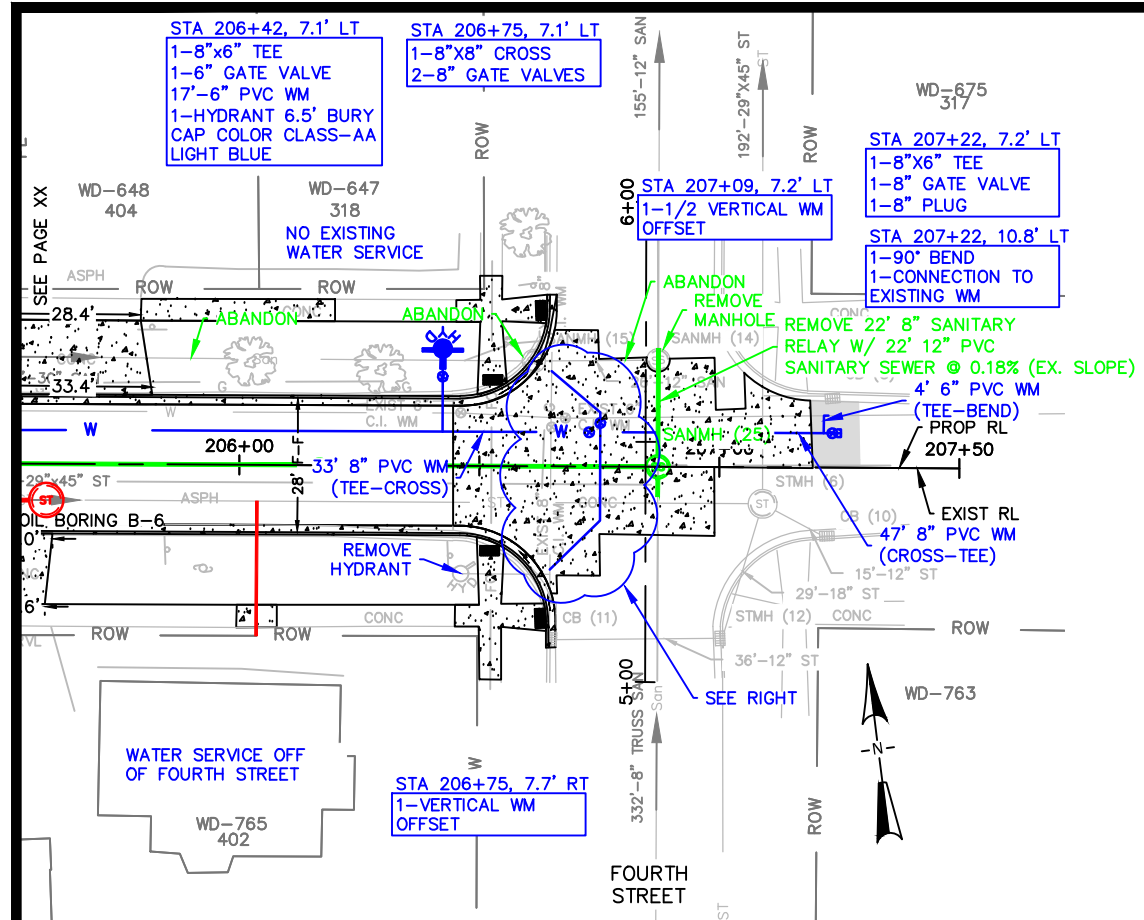


X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Front Street\20-02 Front Align.dwg



NOTE:
1. VERIFY SANITARY LATERALS PRIOR TO WATER MAIN INSTALLATION.





CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

COLLEGE AVENUE
 75' WEST OF FOURTH ST TO FOURTH STREET
 SANITARY SEWER AND WATER MAIN

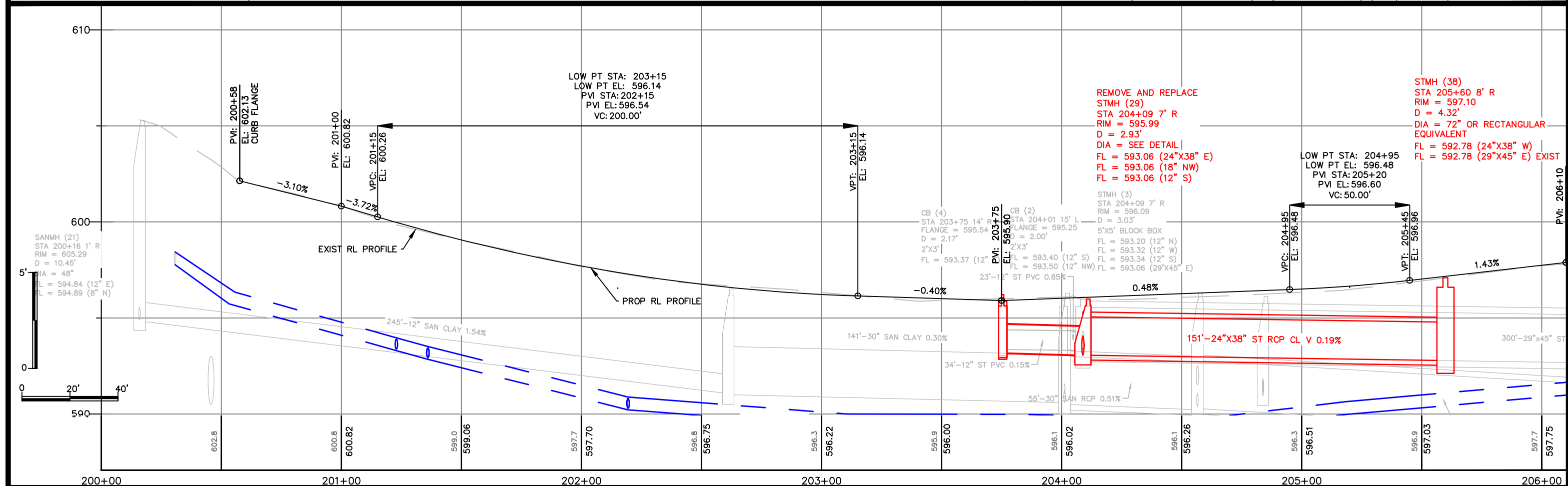
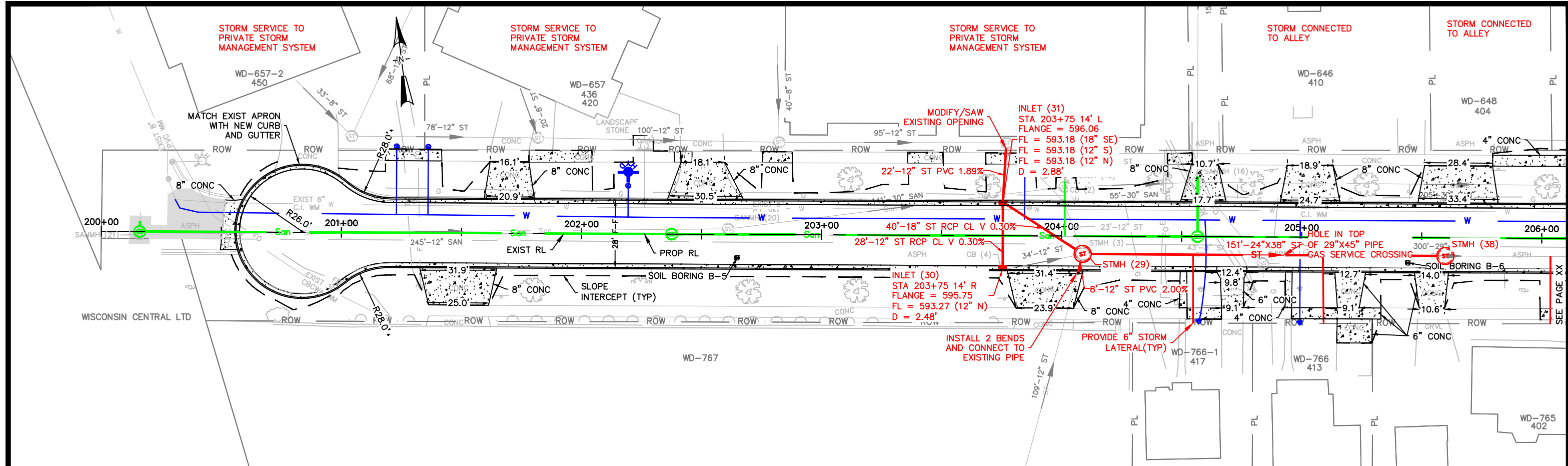
NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02

NO.	DATE	BY	REMARKS
SURVEYED	12-2018	KAD	
DRAWN	12-2018	KAD	
DESIGNED	12-2018	KAD	
CHECKED	12-2018	EPR	

REVISIONS / ISSUES			
NO.	DATE	BY	REMARKS

PAGE NO. **C115**

x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\College\College_P&P.dwg



CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

COLLEGE AVENUE
 675' WEST OF FOURTH ST TO 75' WEST OF FOURTH ST
 STORM SEWER AND STREET

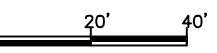
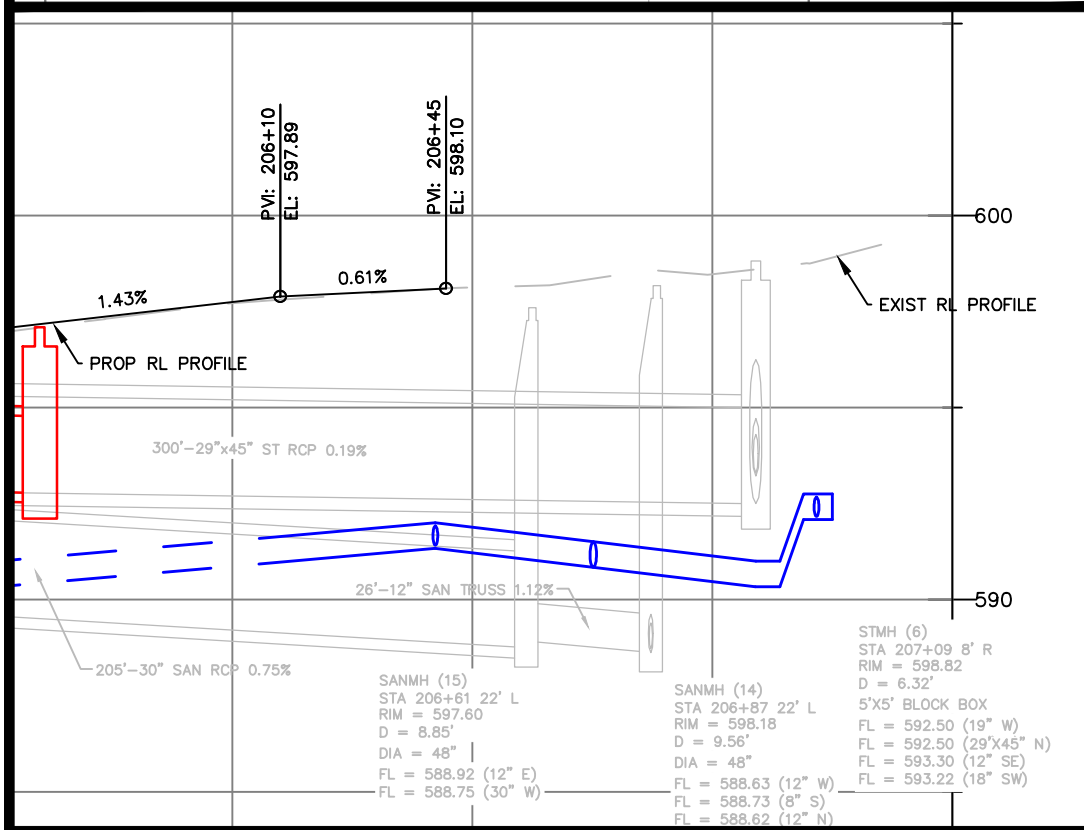
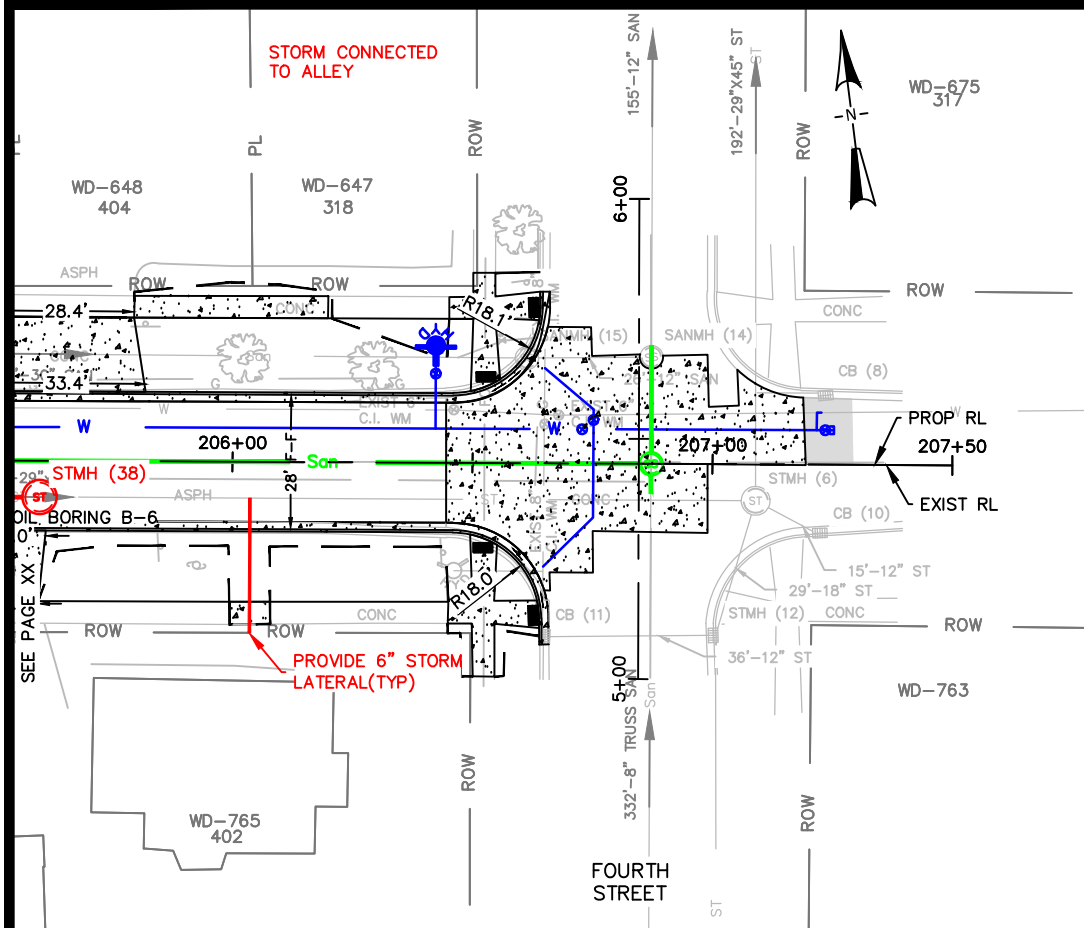
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

BY	DATE
SURVEYED	KAD 12-2018
DRAWN	KAD 12-2018
DESIGNED	KAD 12-2018
CHECKED	EPR 12-2018

REVISIONS / ISSUES	
NO.	DATE

PAGE NO. **C116**

x:\ENR\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\College\College_P&P.dwg



COLLEGE AVENUE DETOUR



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

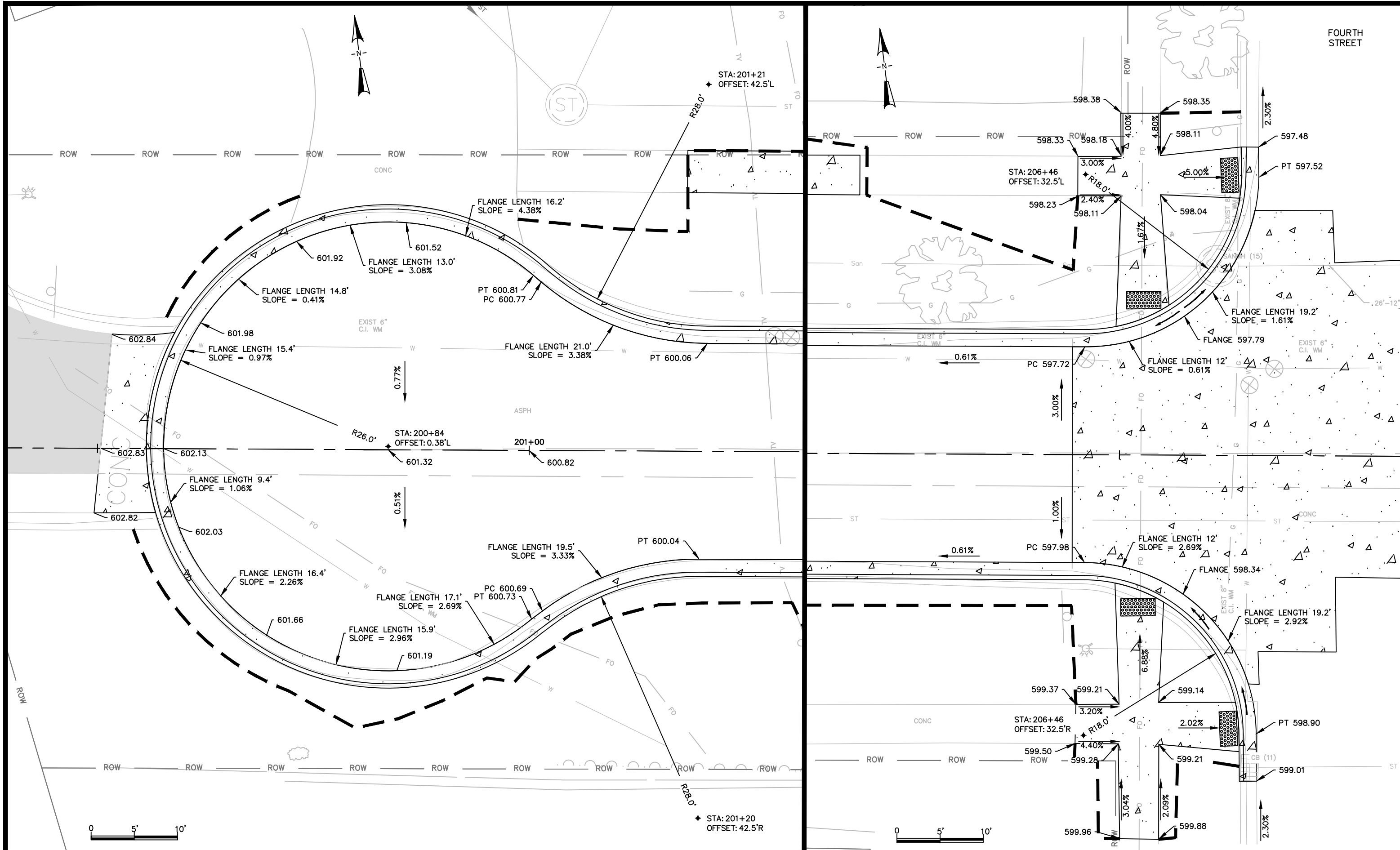
**COLLEGE AVENUE
75' WEST OF FOURTH ST TO FOURTH ST
STORM SEWER AND STREET**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02

	BY	DATE
SURVEYED	KAD	12-2018
DRAWN	KAD	12-2018
DESIGNED	KAD	12-2018
CHECKED	EPR	12-2018

REVISIONS / ISSUES		
NO.	DATE	REMARKS

x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\College\College_P&P.dwg



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

**COLLEGE AVENUE
 ROAD GRADES**

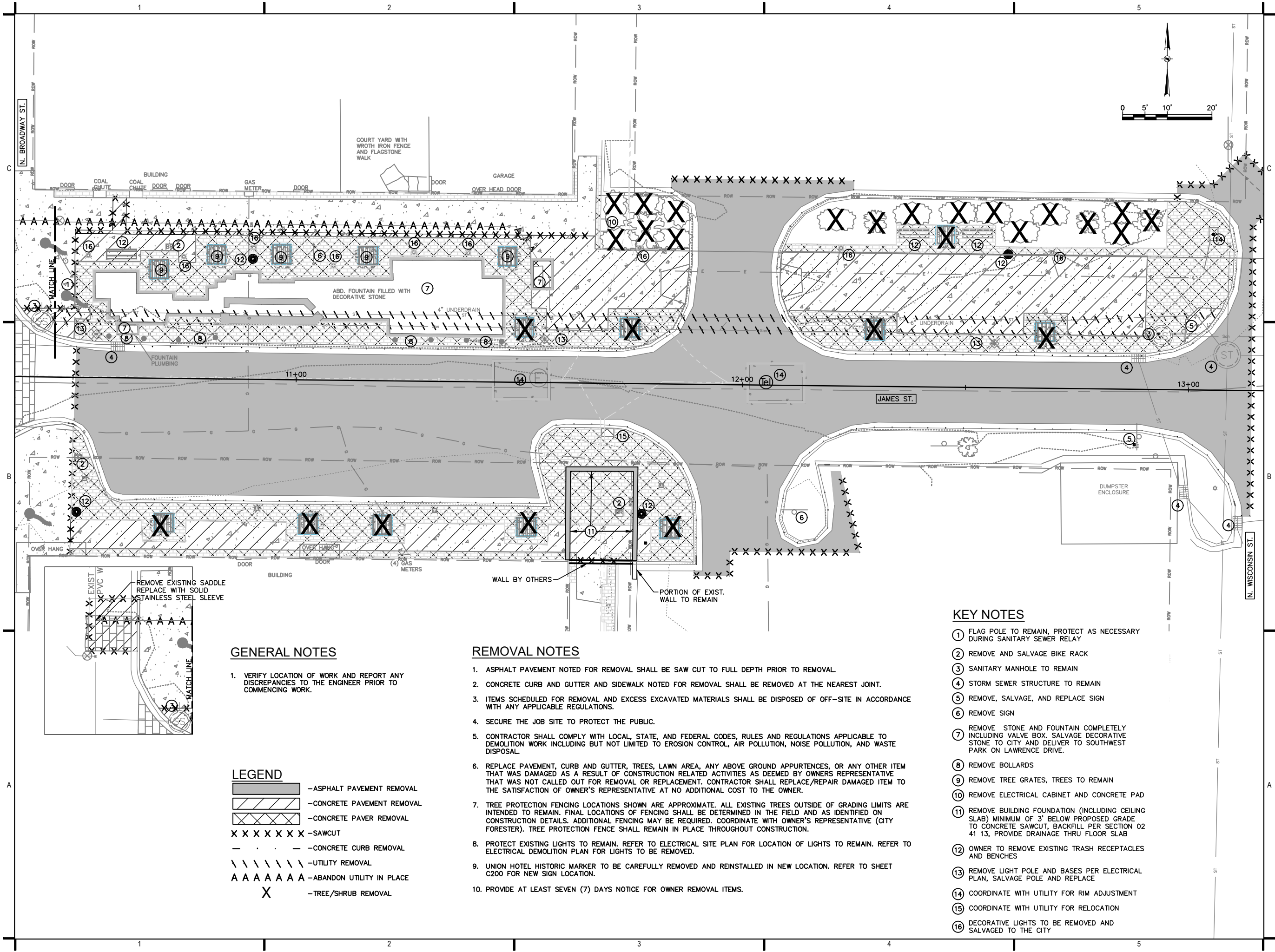
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

	BY	DATE
SURVEYED	KAD	12-2018
DRAWN	KAD	12-2018
DESIGNED	KAD	12-2018
CHECKED	EPR	12-2018

REVISIONS / ISSUES

NO.	DATE	BY	REMARKS

X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\College\College_P&P.dwg



GENERAL NOTES

1. VERIFY LOCATION OF WORK AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

LEGEND

- ASPHALT PAVEMENT REMOVAL
- CONCRETE PAVEMENT REMOVAL
- CONCRETE PAVER REMOVAL
- SAWCUT
- CONCRETE CURB REMOVAL
- UTILITY REMOVAL
- ABANDON UTILITY IN PLACE
- TREE/SHRUB REMOVAL

REMOVAL NOTES

1. ASPHALT PAVEMENT NOTED FOR REMOVAL SHALL BE SAW CUT TO FULL DEPTH PRIOR TO REMOVAL.
2. CONCRETE CURB AND GUTTER AND SIDEWALK NOTED FOR REMOVAL SHALL BE REMOVED AT THE NEAREST JOINT.
3. ITEMS SCHEDULED FOR REMOVAL AND EXCESS EXCAVATED MATERIALS SHALL BE DISPOSED OF OFF-SITE IN ACCORDANCE WITH ANY APPLICABLE REGULATIONS.
4. SECURE THE JOB SITE TO PROTECT THE PUBLIC.
5. CONTRACTOR SHALL COMPLY WITH LOCAL, STATE, AND FEDERAL CODES, RULES AND REGULATIONS APPLICABLE TO DEMOLITION WORK INCLUDING BUT NOT LIMITED TO EROSION CONTROL, AIR POLLUTION, NOISE POLLUTION, AND WASTE DISPOSAL.
6. REPLACE PAVEMENT, CURB AND GUTTER, TREES, LAWN AREA, ANY ABOVE GROUND APPURTENANCES, OR ANY OTHER ITEM THAT WAS DAMAGED AS A RESULT OF CONSTRUCTION RELATED ACTIVITIES AS DEEMED BY OWNERS REPRESENTATIVE THAT WAS NOT CALLED OUT FOR REMOVAL OR REPLACEMENT. CONTRACTOR SHALL REPLACE/REPAIR DAMAGED ITEM TO THE SATISFACTION OF OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST TO THE OWNER.
7. TREE PROTECTION FENCING LOCATIONS SHOWN ARE APPROXIMATE. ALL EXISTING TREES OUTSIDE OF GRADING LIMITS ARE INTENDED TO REMAIN. FINAL LOCATIONS OF FENCING SHALL BE DETERMINED IN THE FIELD AND AS IDENTIFIED ON CONSTRUCTION DETAILS. ADDITIONAL FENCING MAY BE REQUIRED. COORDINATE WITH OWNER'S REPRESENTATIVE (CITY FORESTER). TREE PROTECTION FENCE SHALL REMAIN IN PLACE THROUGHOUT CONSTRUCTION.
8. PROTECT EXISTING LIGHTS TO REMAIN. REFER TO ELECTRICAL SITE PLAN FOR LOCATION OF LIGHTS TO REMAIN. REFER TO ELECTRICAL DEMOLITION PLAN FOR LIGHTS TO BE REMOVED.
9. UNION HOTEL HISTORIC MARKER TO BE CAREFULLY REMOVED AND REINSTALLED IN NEW LOCATION. REFER TO SHEET C200 FOR NEW SIGN LOCATION.
10. PROVIDE AT LEAST SEVEN (7) DAYS NOTICE FOR OWNER REMOVAL ITEMS.

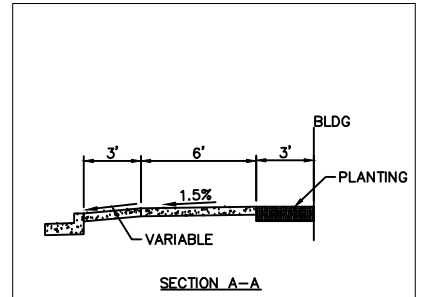
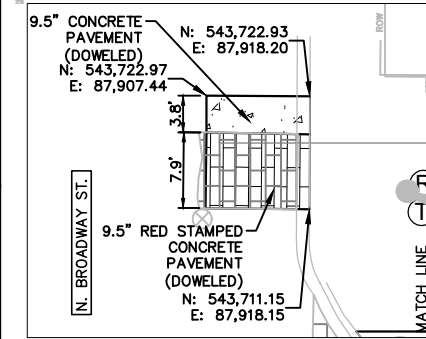
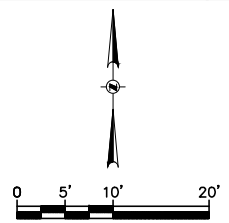
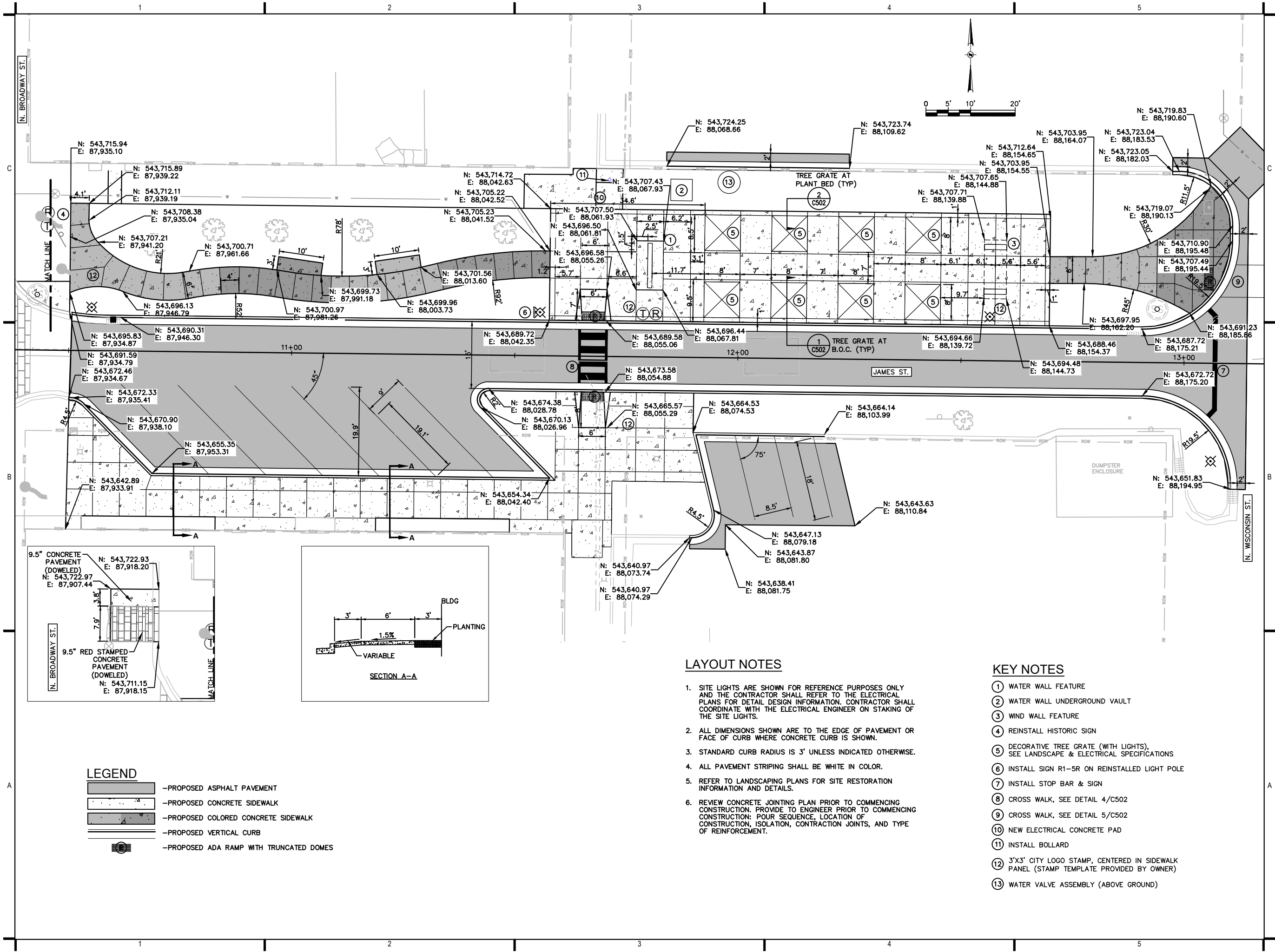
KEY NOTES

- ① FLAG POLE TO REMAIN, PROTECT AS NECESSARY DURING SANITARY SEWER RELAY
- ② REMOVE AND SALVAGE BIKE RACK
- ③ SANITARY MANHOLE TO REMAIN
- ④ STORM SEWER STRUCTURE TO REMAIN
- ⑤ REMOVE, SALVAGE, AND REPLACE SIGN
- ⑥ REMOVE SIGN
- ⑦ REMOVE STONE AND FOUNTAIN COMPLETELY INCLUDING VALVE BOX. SALVAGE DECORATIVE STONE TO CITY AND DELIVER TO SOUTHWEST PARK ON LAWRENCE DRIVE.
- ⑧ REMOVE BOLLARDS
- ⑨ REMOVE TREE GRATES, TREES TO REMAIN
- ⑩ REMOVE ELECTRICAL CABINET AND CONCRETE PAD
- ⑪ REMOVE BUILDING FOUNDATION (INCLUDING CEILING SLAB) MINIMUM OF 3' BELOW PROPOSED GRADE TO CONCRETE SAWCUT, BACKFILL PER SECTION 02 41 13, PROVIDE DRAINAGE THRU FLOOR SLAB
- ⑫ OWNER TO REMOVE EXISTING TRASH RECEPTACLES AND BENCHES
- ⑬ REMOVE LIGHT POLE AND BASES PER ELECTRICAL PLAN, SALVAGE POLE AND REPLACE
- ⑭ COORDINATE WITH UTILITY FOR RIM ADJUSTMENT
- ⑮ COORDINATE WITH UTILITY FOR RELOCATION
- ⑯ DECORATIVE LIGHTS TO BE REMOVED AND SALVAGED TO THE CITY

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted

X:\ENGINE\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\JamesC120 LAYOUT 2/17/2020 12:51 PM



LEGEND

- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE SIDEWALK
- PROPOSED COLORED CONCRETE SIDEWALK
- PROPOSED VERTICAL CURB
- PROPOSED ADA RAMP WITH TRUNCATED DOMES

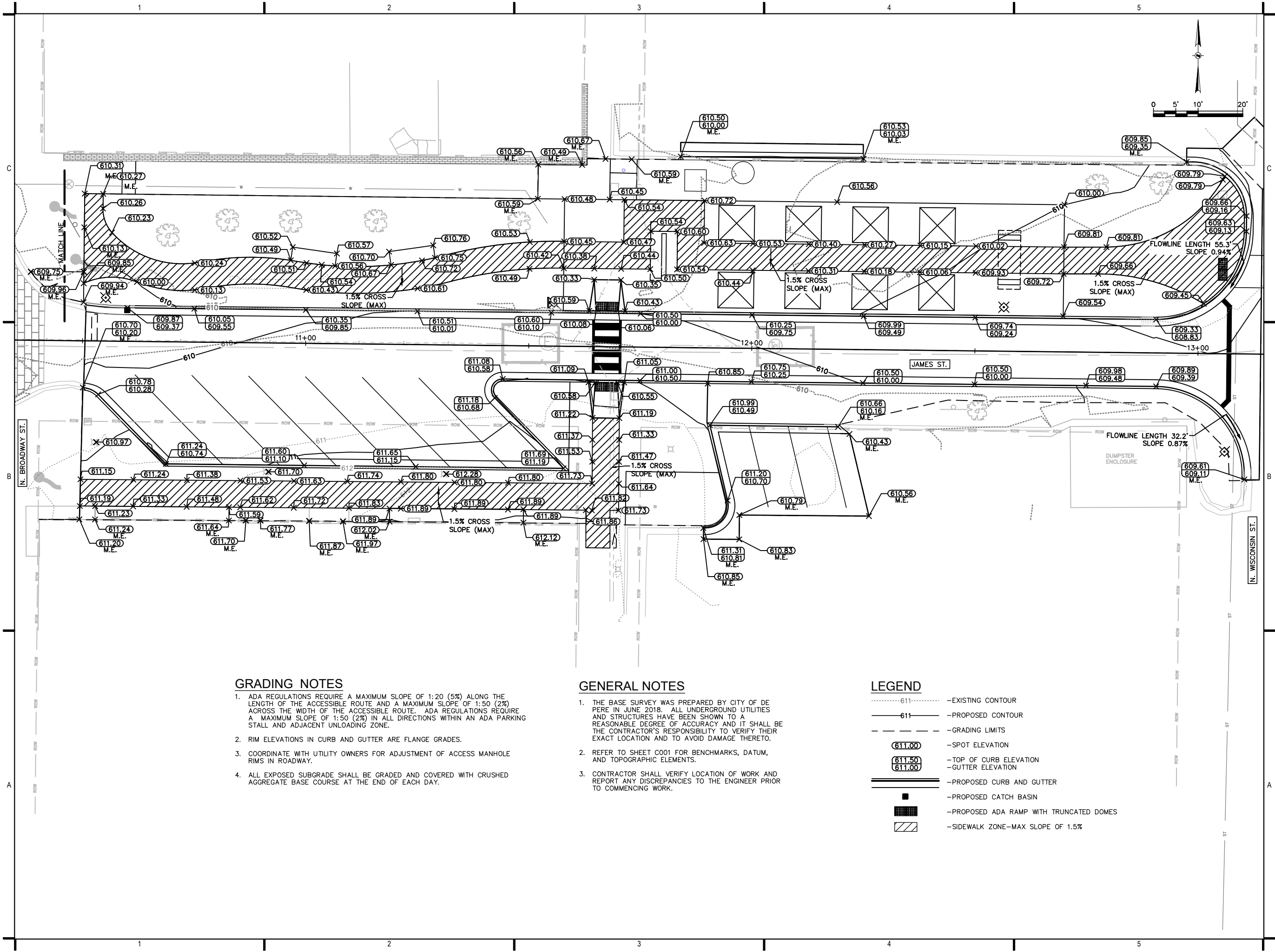
LAYOUT NOTES

1. SITE LIGHTS ARE SHOWN FOR REFERENCE PURPOSES ONLY AND THE CONTRACTOR SHALL REFER TO THE ELECTRICAL PLANS FOR DETAIL DESIGN INFORMATION. CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL ENGINEER ON STAKING OF THE SITE LIGHTS.
2. ALL DIMENSIONS SHOWN ARE TO THE EDGE OF PAVEMENT OR FACE OF CURB WHERE CONCRETE CURB IS SHOWN.
3. STANDARD CURB RADIUS IS 3' UNLESS INDICATED OTHERWISE.
4. ALL PAVEMENT STRIPING SHALL BE WHITE IN COLOR.
5. REFER TO LANDSCAPING PLANS FOR SITE RESTORATION INFORMATION AND DETAILS.
6. REVIEW CONCRETE JOINTING PLAN PRIOR TO COMMENCING CONSTRUCTION. PROVIDE TO ENGINEER PRIOR TO COMMENCING CONSTRUCTION: POUR SEQUENCE, LOCATION OF CONSTRUCTION, ISOLATION, CONTRACTION JOINTS, AND TYPE OF REINFORCEMENT.

KEY NOTES

- ① WATER WALL FEATURE
- ② WATER WALL UNDERGROUND VAULT
- ③ WIND WALL FEATURE
- ④ REINSTALL HISTORIC SIGN
- ⑤ DECORATIVE TREE GRATE (WITH LIGHTS), SEE LANDSCAPE & ELECTRICAL SPECIFICATIONS
- ⑥ INSTALL SIGN R1-SR ON REINSTALLED LIGHT POLE
- ⑦ INSTALL STOP BAR & SIGN
- ⑧ CROSS WALK, SEE DETAIL 4/C502
- ⑨ CROSS WALK, SEE DETAIL 5/C502
- ⑩ NEW ELECTRICAL CONCRETE PAD
- ⑪ INSTALL BOLLARD
- ⑫ 3'X3' CITY LOGO STAMP, CENTERED IN SIDEWALK PANEL (STAMP TEMPLATE PROVIDED BY OWNER)
- ⑬ WATER VALVE ASSEMBLY (ABOVE GROUND)

X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James C\121 GRADING 2/17/2020 12:54 PM



GRADING NOTES

- ADA REGULATIONS REQUIRE A MAXIMUM SLOPE OF 1:20 (5%) ALONG THE LENGTH OF THE ACCESSIBLE ROUTE AND A MAXIMUM SLOPE OF 1:50 (2%) ACROSS THE WIDTH OF THE ACCESSIBLE ROUTE. ADA REGULATIONS REQUIRE A MAXIMUM SLOPE OF 1:50 (2%) IN ALL DIRECTIONS WITHIN AN ADA PARKING STALL AND ADJACENT UNLOADING ZONE.
- RIM ELEVATIONS IN CURB AND GUTTER ARE FLANGE GRADES.
- COORDINATE WITH UTILITY OWNERS FOR ADJUSTMENT OF ACCESS MANHOLE RIMS IN ROADWAY.
- ALL EXPOSED SUBGRADE SHALL BE GRADED AND COVERED WITH CRUSHED AGGREGATE BASE COURSE AT THE END OF EACH DAY.

GENERAL NOTES

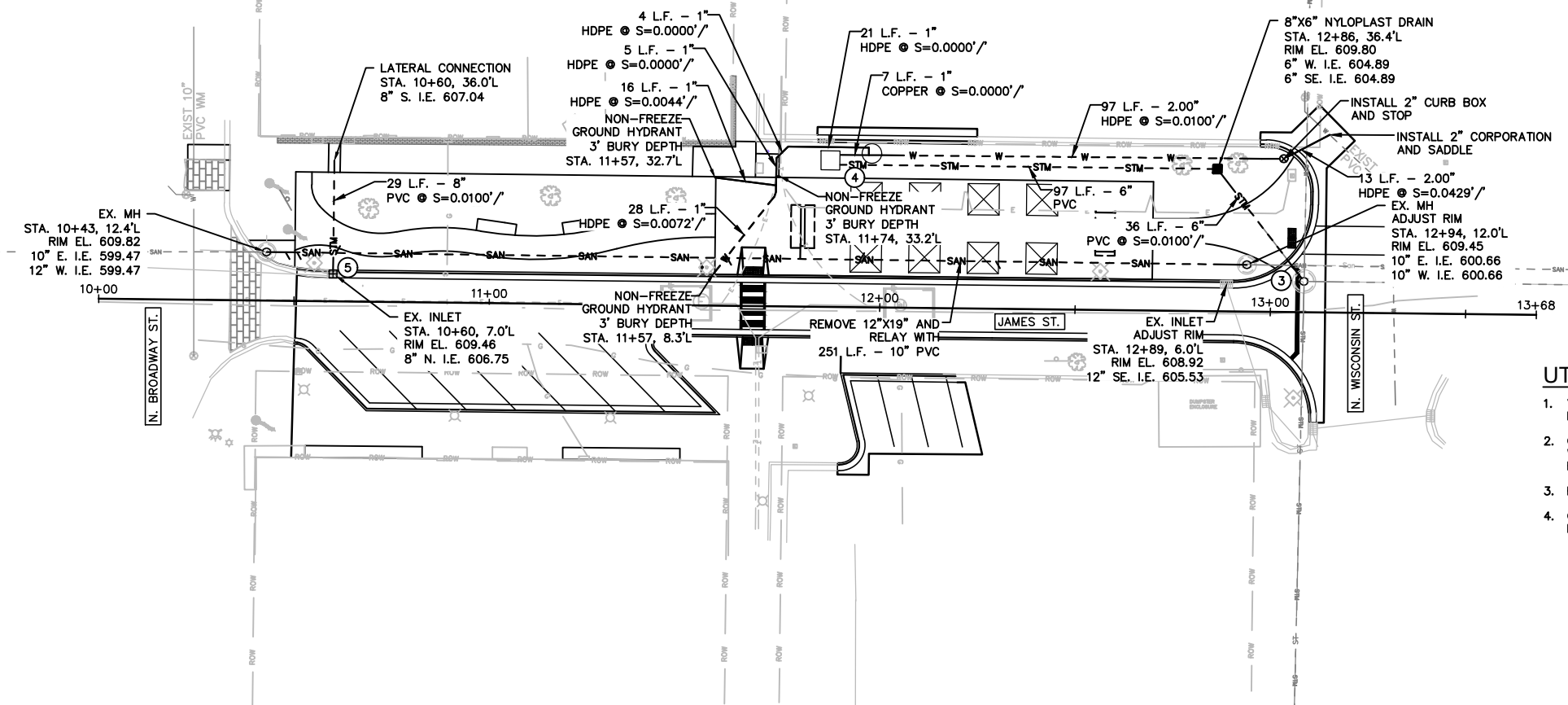
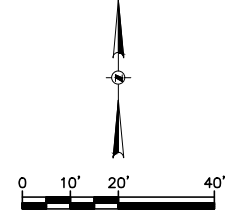
- THE BASE SURVEY WAS PREPARED BY CITY OF DE PERE IN JUNE 2018. ALL UNDERGROUND UTILITIES AND STRUCTURES HAVE BEEN SHOWN TO A REASONABLE DEGREE OF ACCURACY AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THEIR EXACT LOCATION AND TO AVOID DAMAGE THERETO.
- REFER TO SHEET C001 FOR BENCHMARKS, DATUM, AND TOPOGRAPHIC ELEMENTS.
- CONTRACTOR SHALL VERIFY LOCATION OF WORK AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

LEGEND

- 611----- -EXISTING CONTOUR
- 611————— -PROPOSED CONTOUR
- - - - - -GRADING LIMITS
- (611.00) -SPOT ELEVATION
- (611.50) -TOP OF CURB ELEVATION
- (611.00) -GUTTER ELEVATION
- ===== -PROPOSED CURB AND GUTTER
- -PROPOSED CATCH BASIN
- ▒ -PROPOSED ADA RAMP WITH TRUNCATED DOMES
- ▨ -SIDEWALK ZONE-MAX SLOPE OF 1.5%

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted

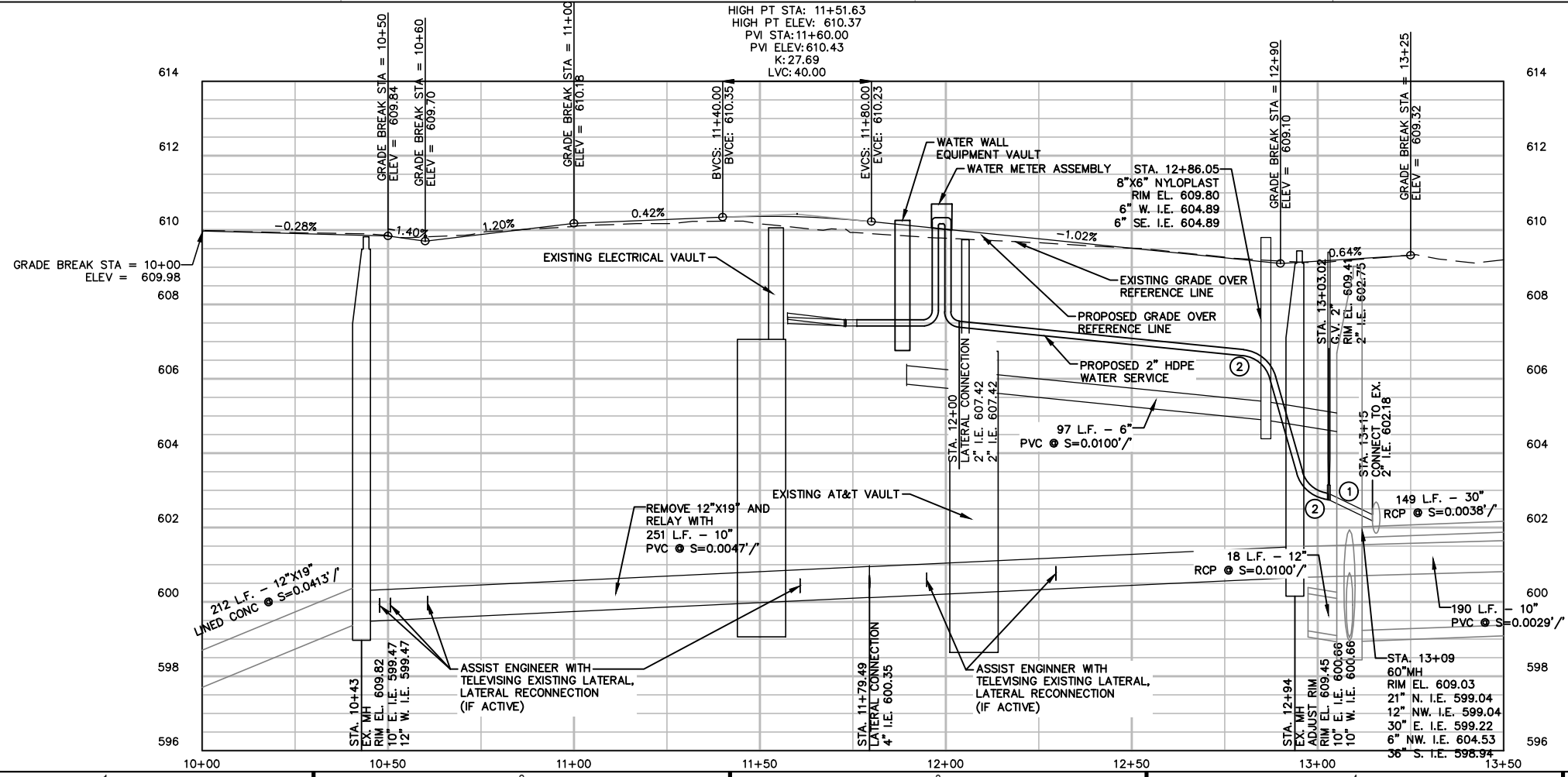


UTILITY NOTES

1. VERIFY ELEVATION OF EXISTING INVERTS PRIOR TO INSTALLATION OF PROPOSED UTILITIES.
2. CENTER ONE FULL LENGTH OF WATER PIPE ON SEWER AT WATER MAIN CROSSINGS, THAT BOTH JOINTS WILL BE AS FAR FROM SEWER AS POSSIBLE.
3. RIM ELEVATIONS IN CURB AND GUTTER ARE FLANGE GRADES.
4. CITY OF DE PERE TO CONFIRM LOCATION AND EXTENTS OF LATERAL RECONNECTIONS DURING CONSTRUCTION.

KEY NOTES

1. WATER SERVICE TO HAVE SEVEN FEET OF COVER FROM WATER MAIN TO CURB STOP.
2. WATER SERVICE DEPTH MAY BE DECREASED TO 3 FEET TO THE VALVE VAULT. WATER SERVICE TO SLOPE BACK TO CURB STOP.
3. CORE DRILL MANHOLE FOR 6" PVC FL=604.53
4. PROVIDE CONNECTION AND BENDS FROM SUMP LINE TO 6" STORM LATERAL.
5. CORE DRILL INLET FOR 8" PVC FL=606.75



X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200 - CAD\James C\122 PLAN AND PROFILE 2/17/2020 12:55 PM



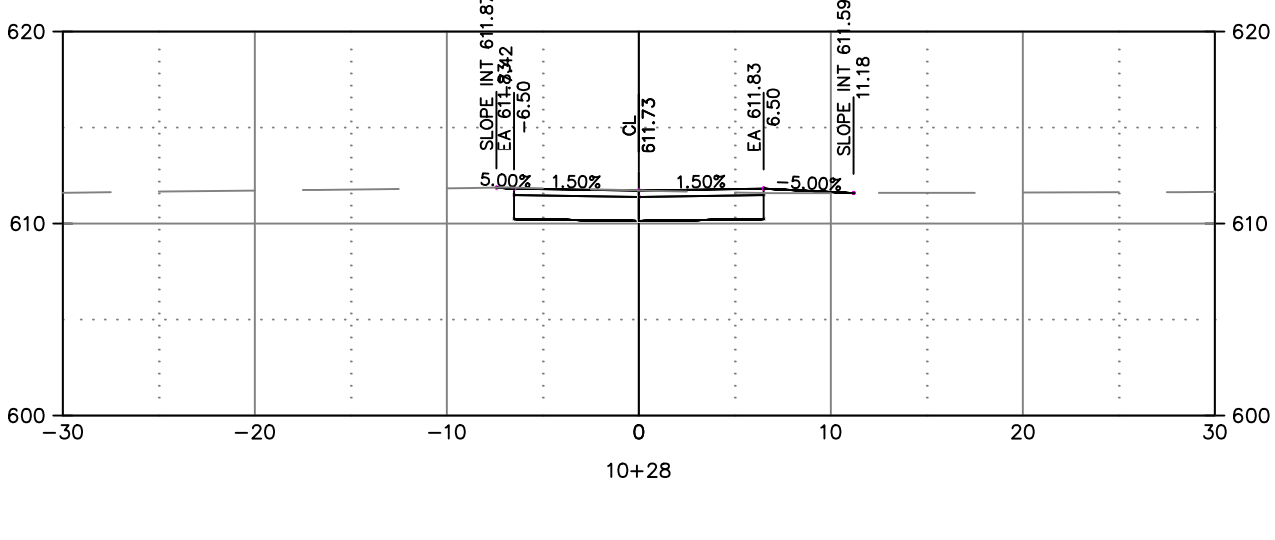
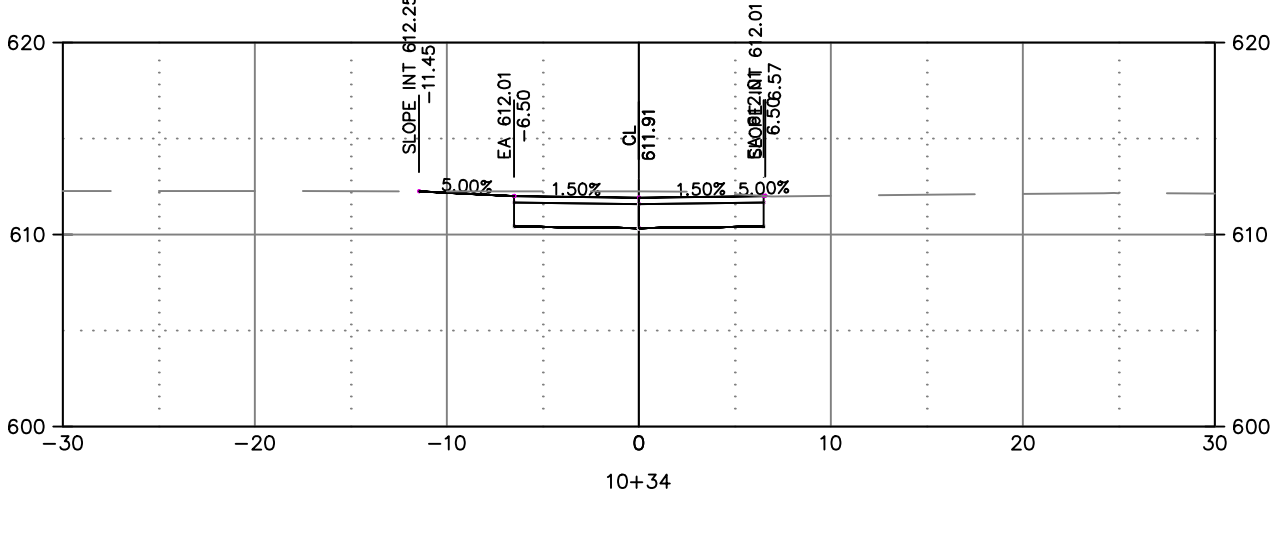
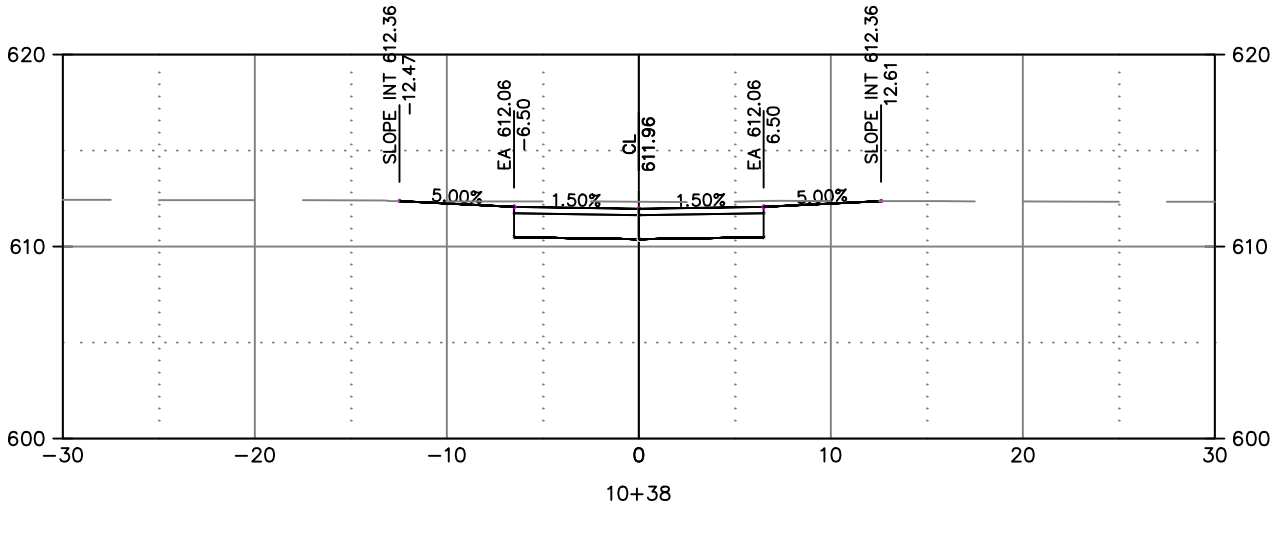
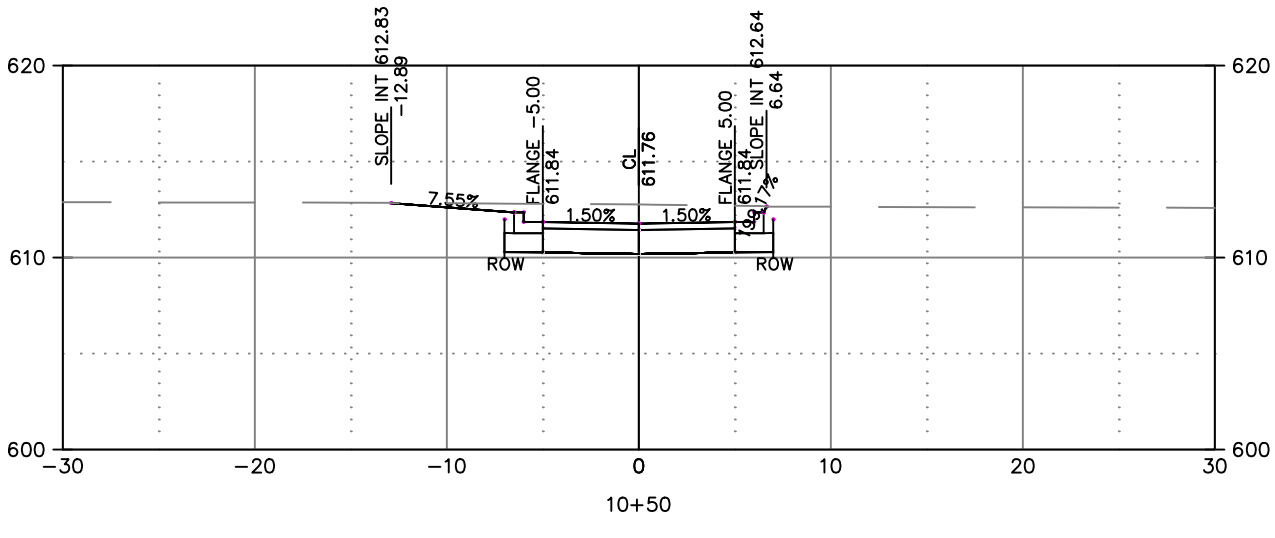
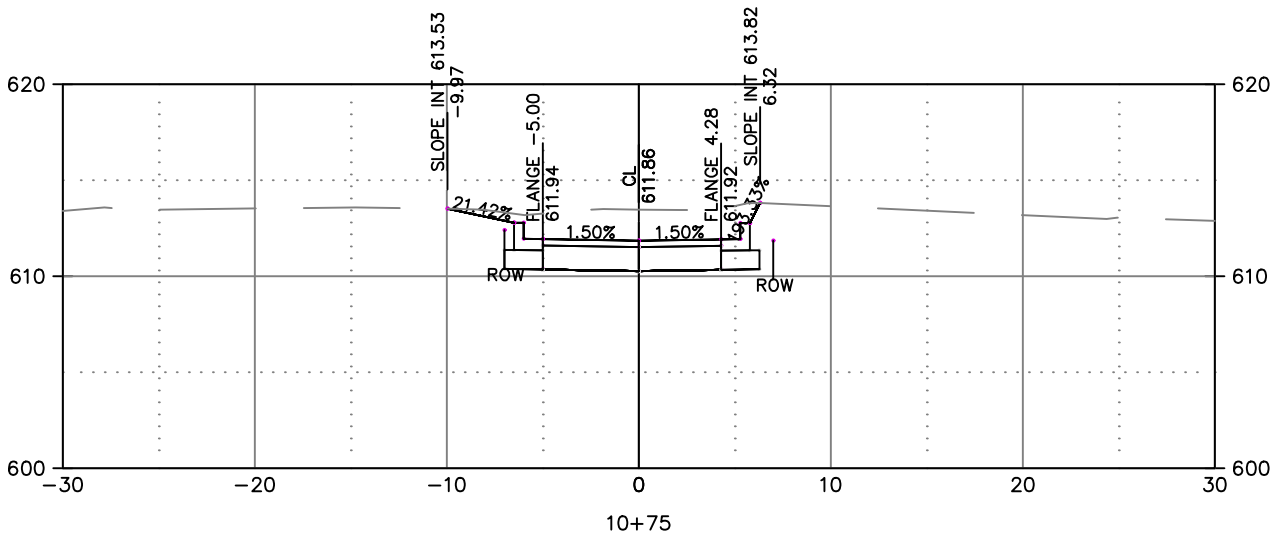
ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

CROSS SECTIONS

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

NO.	DATE	BY	DATE
1	12-2019	R.K.	
2	12-2019	R.K.	
3	01-2020	R.K./KAD	
4	01-2020	EPR	

NO.	DATE	BY	REVISIONS / ISSUES





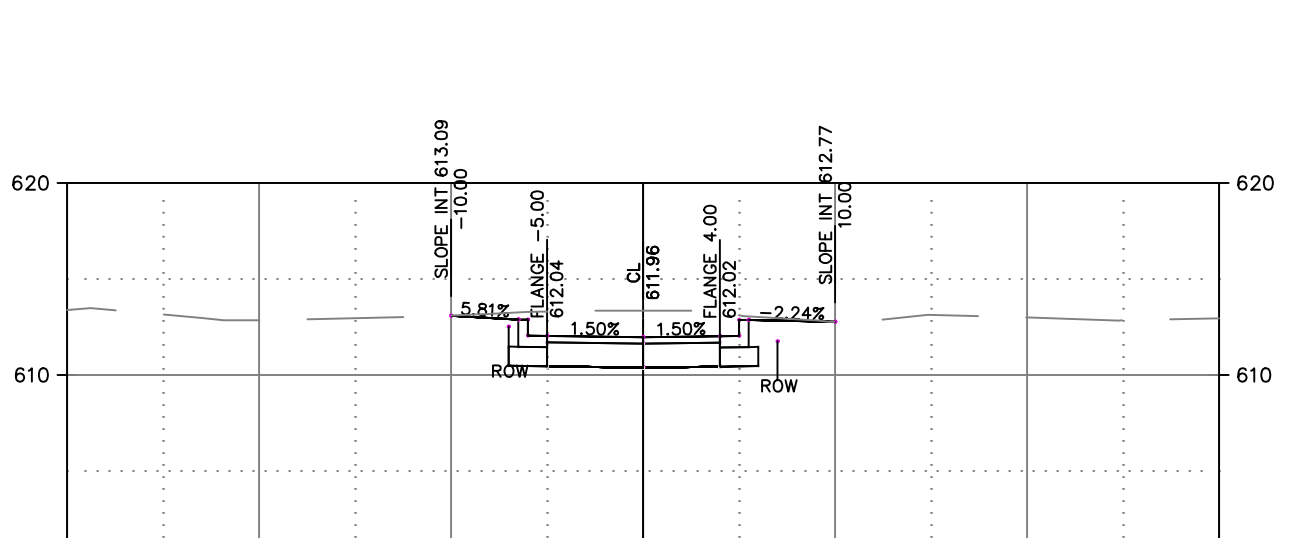
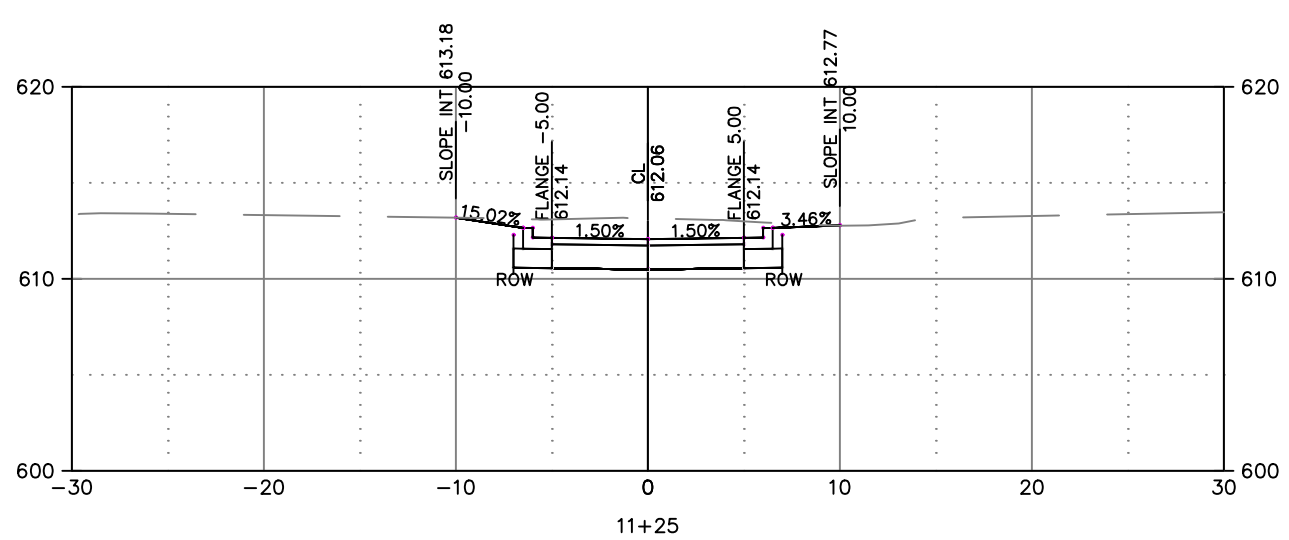
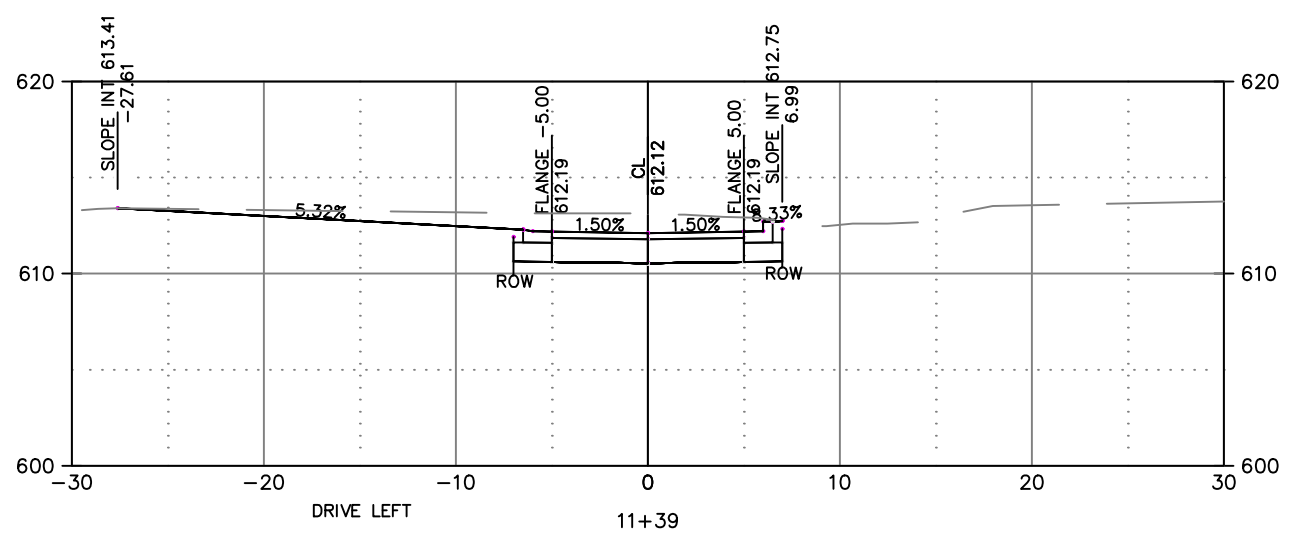
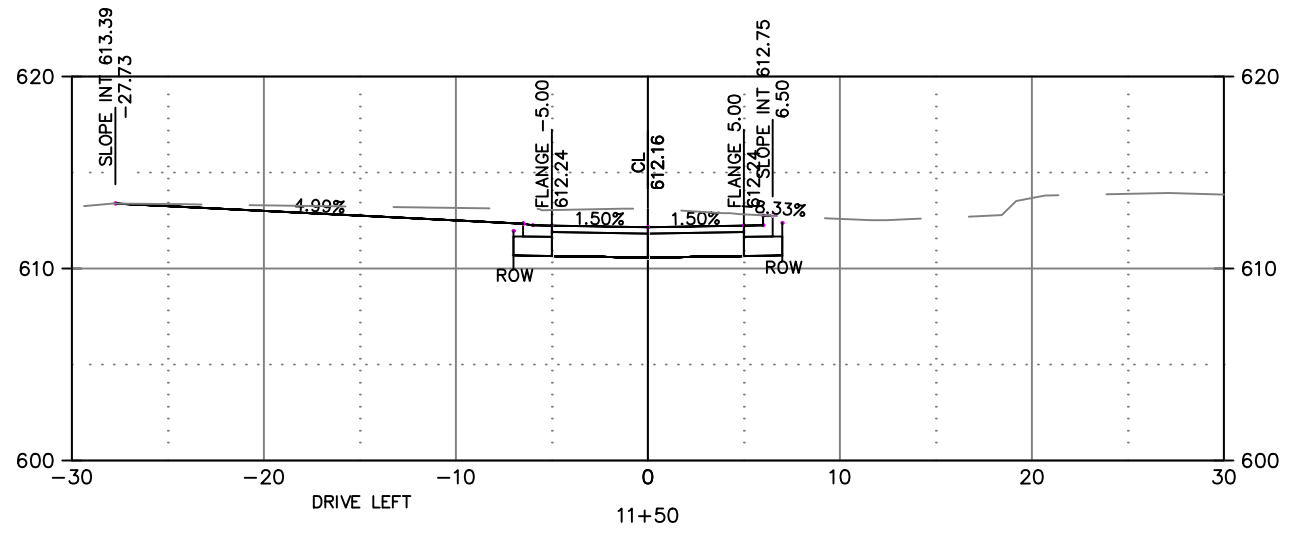
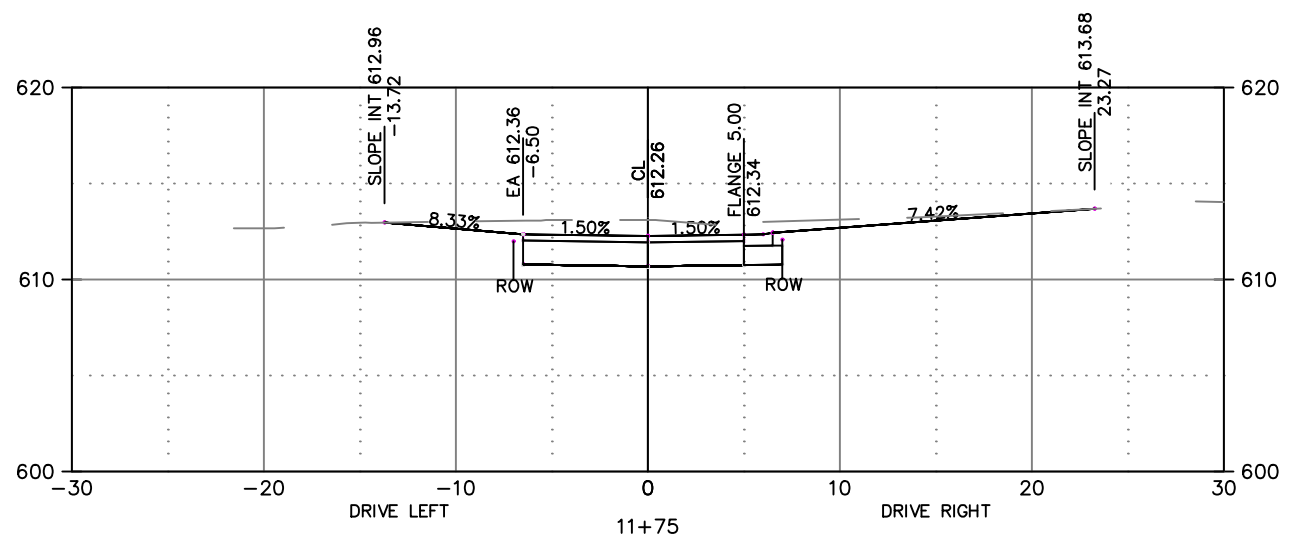
CITY OF DEPERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

ALLEY
CROSS SECTIONS

NAME: RECONSTRUCTION AND
 STREET: UTILITY RELAY
 PROJECT # 20-02

SURVEYED	BY	DATE
DRAWN	R.K.	12-2019
DESIGNED	R.K./K.A.D.	01-2020
CHECKED	EPR	01-2020

NO.	DATE	REVISIONS / ISSUES





ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

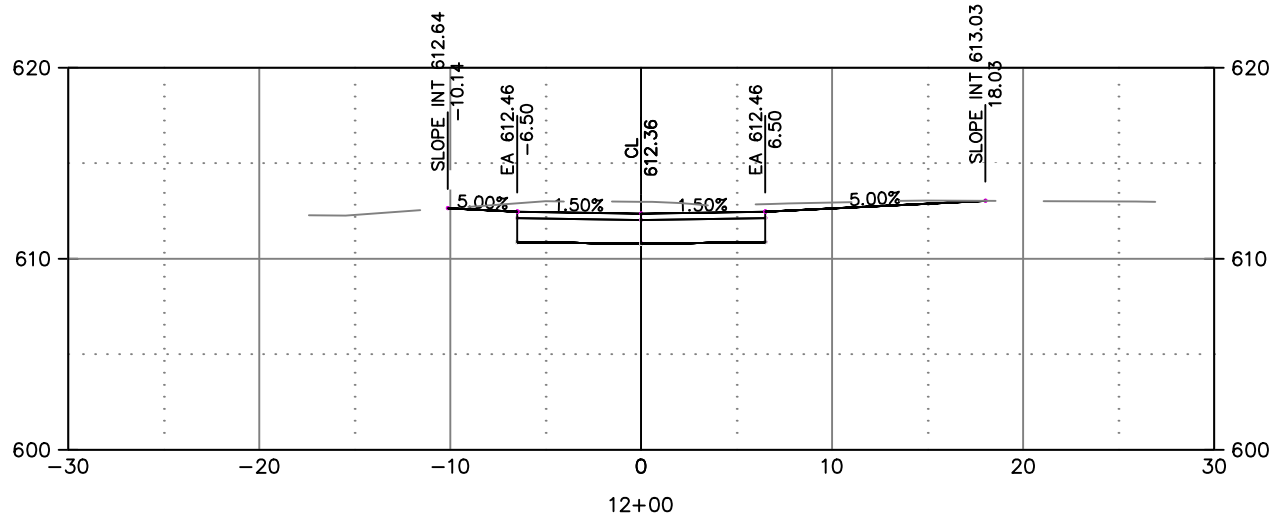
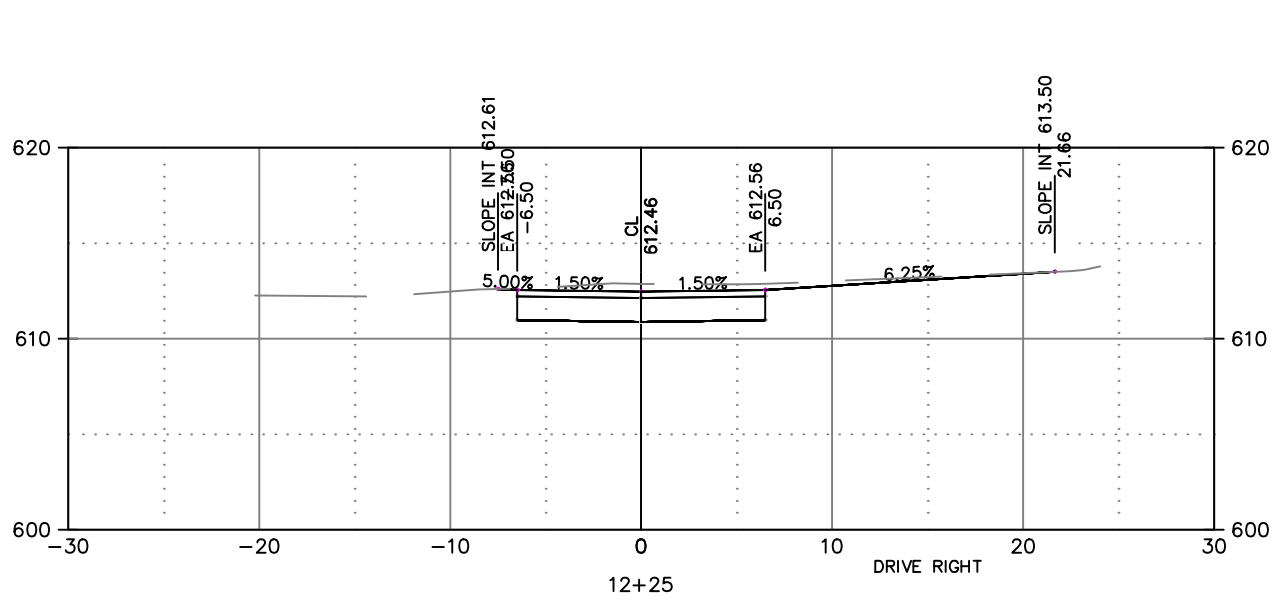
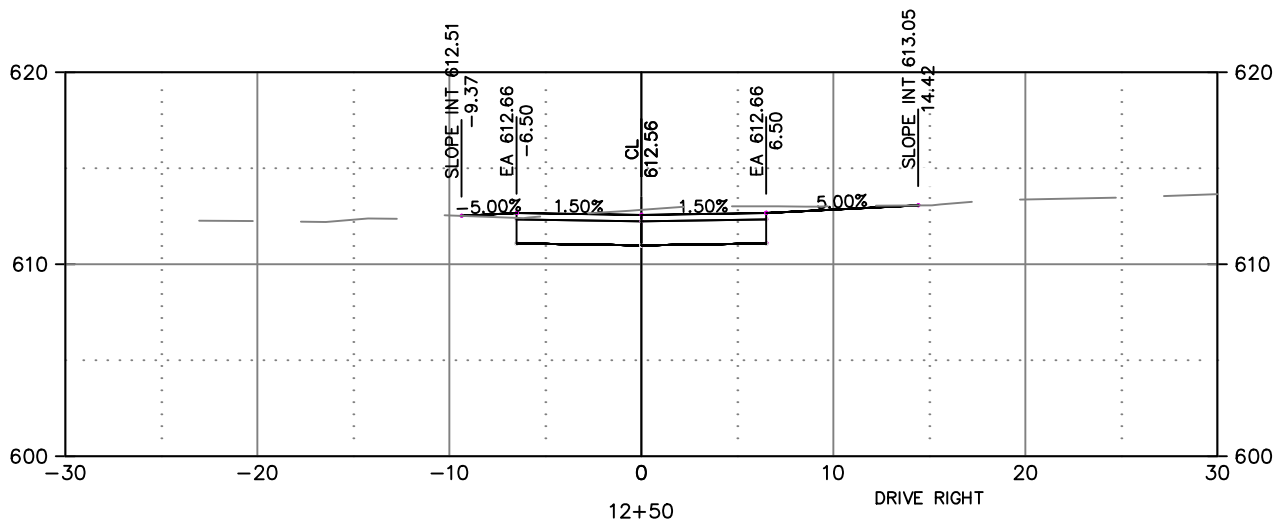
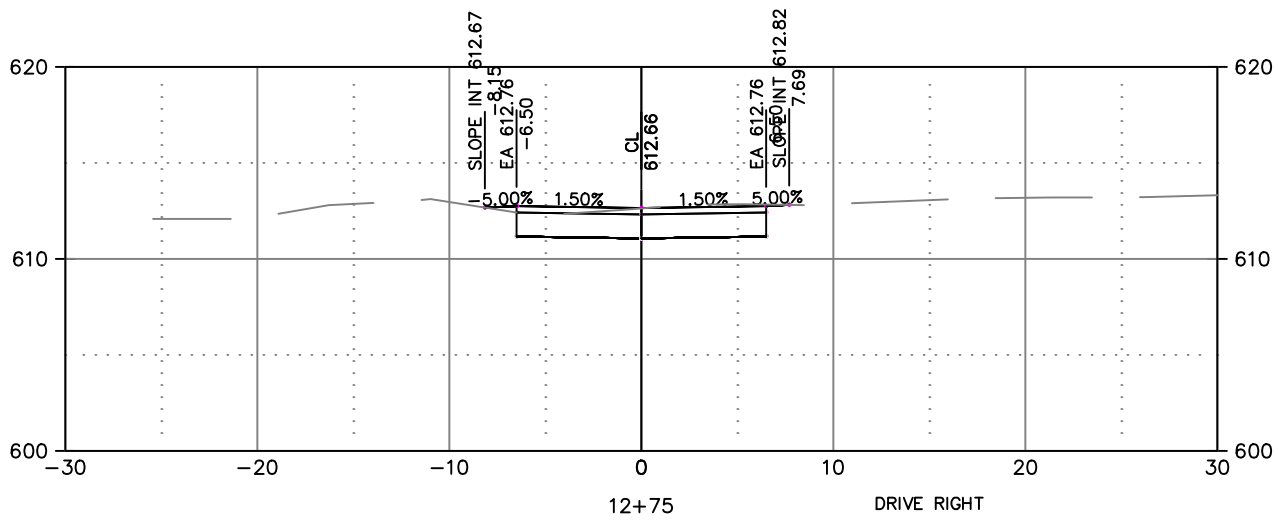
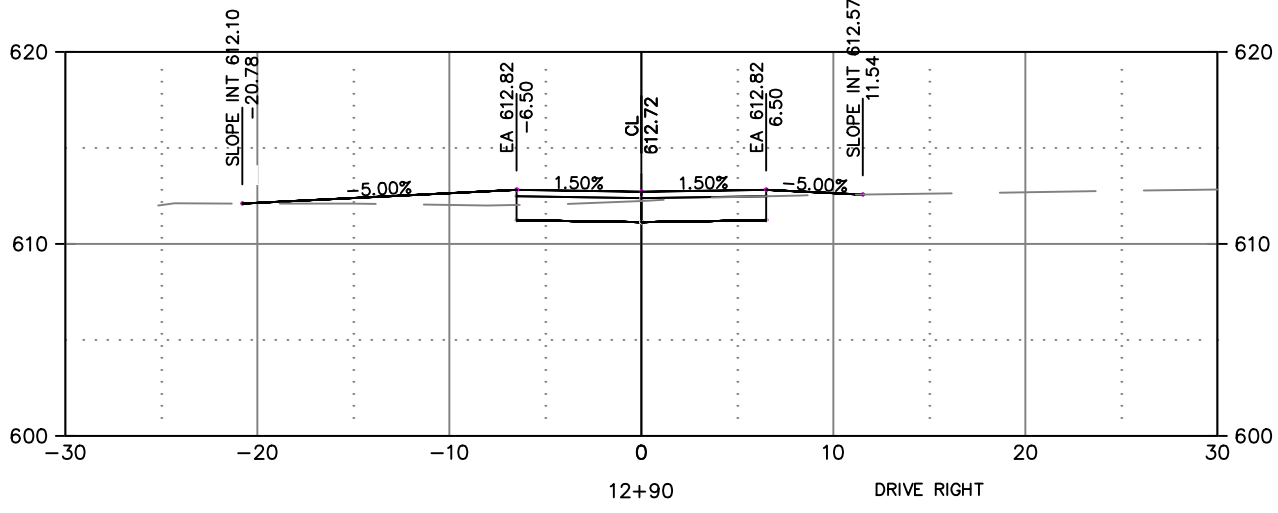
CROSS SECTIONS

NAME: RECONSTRUCTION AND
 STREET: UTILITY RELAY
 PROJECT # 20-02

SURVEYED	BY	DATE
DRAWN	R.K.	12-2019
DESIGNED	R.K./KAD	01-2020
CHECKED	EPR	01-2020

NO.	DATE	REVISIONS / ISSUES

PAGE NO. **C302**



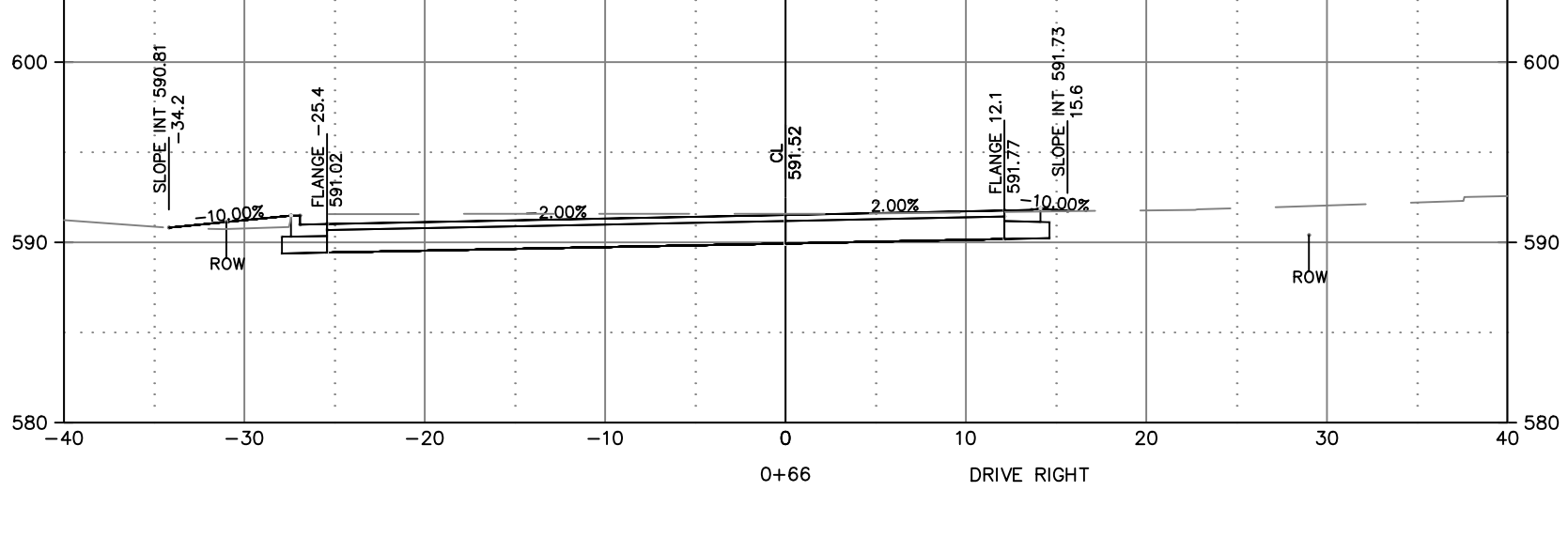
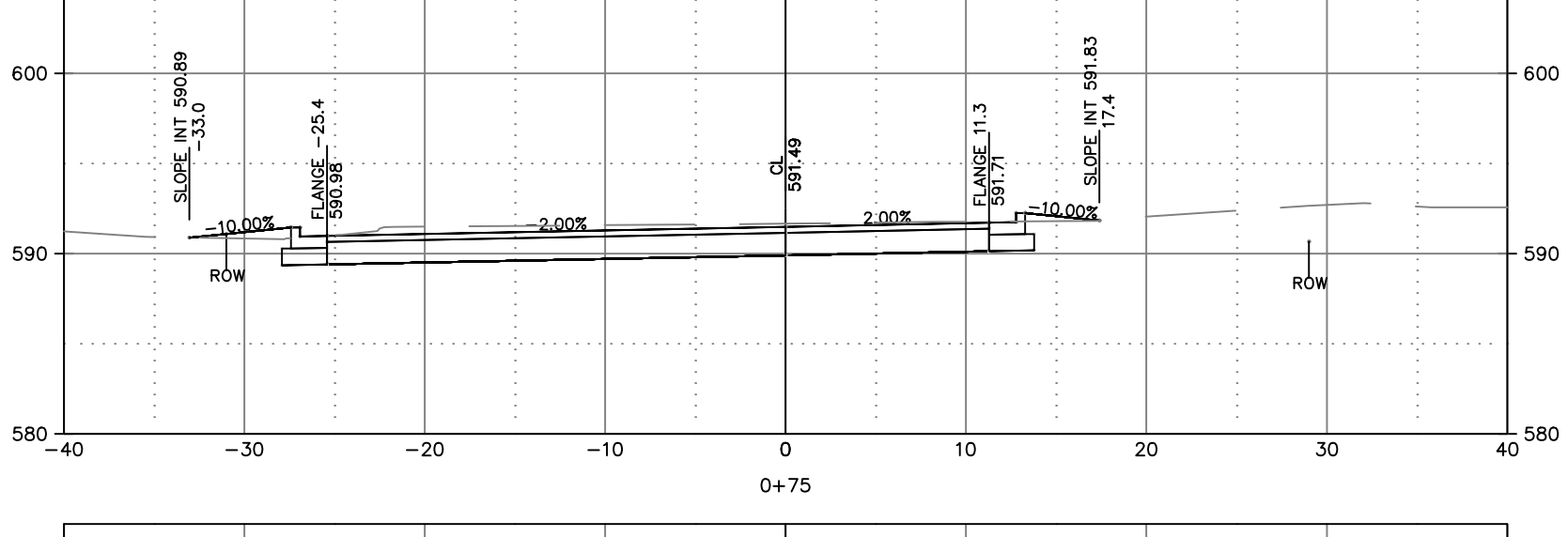
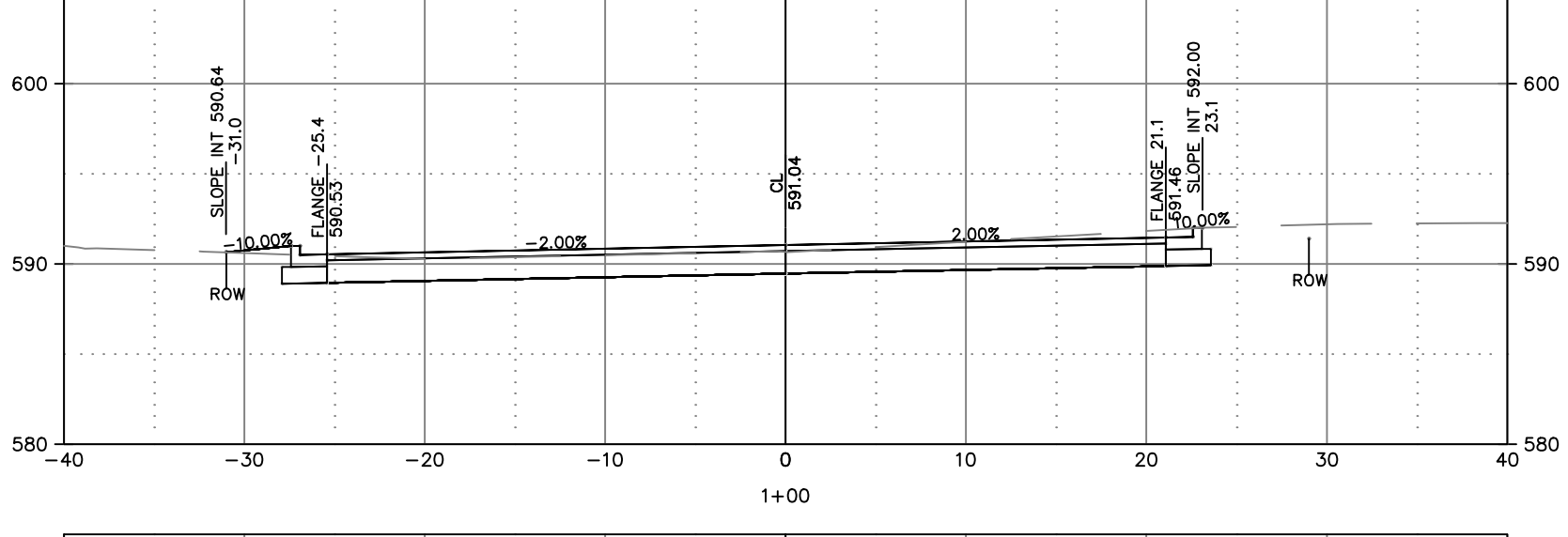
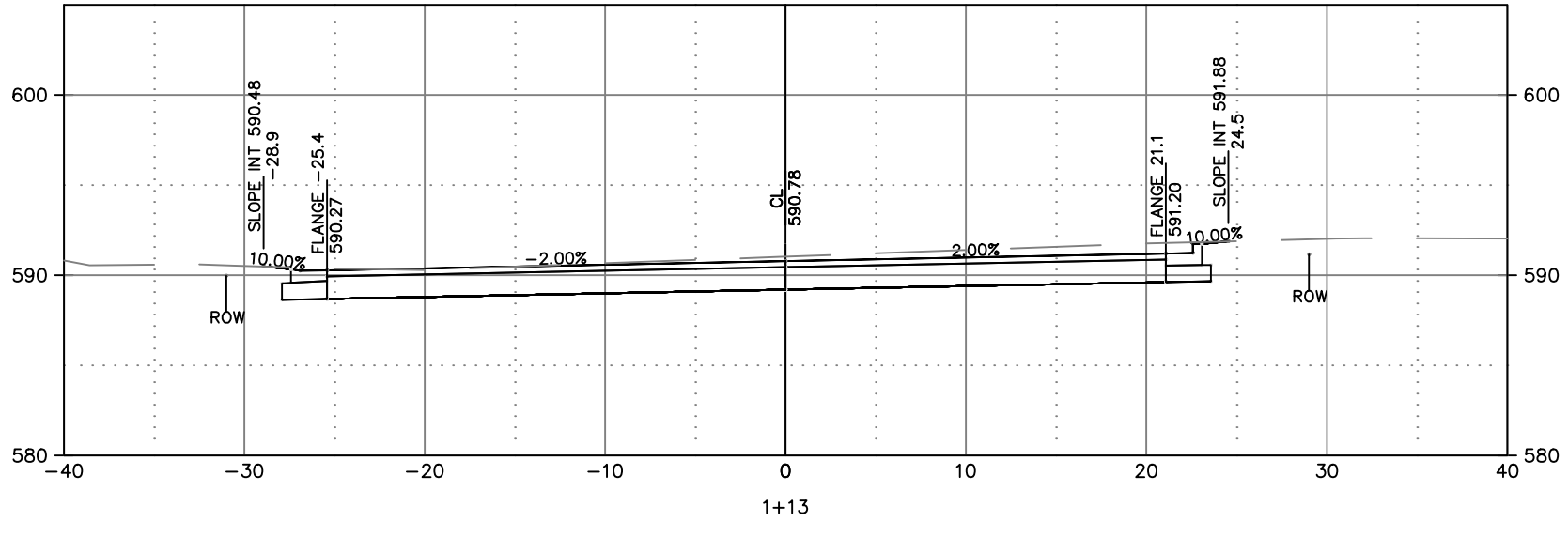
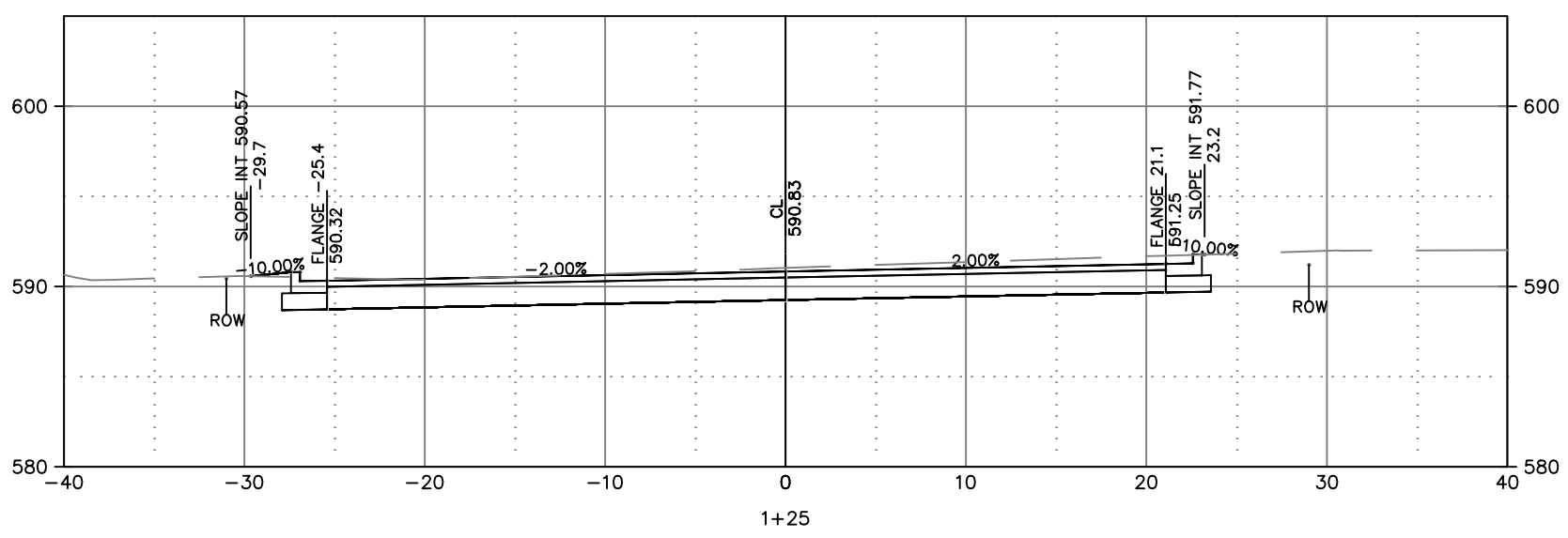


CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

**FRONT STREET PARKING
 CROSS SECTIONS**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

NO.	DATE	REVISIONS / ISSUES





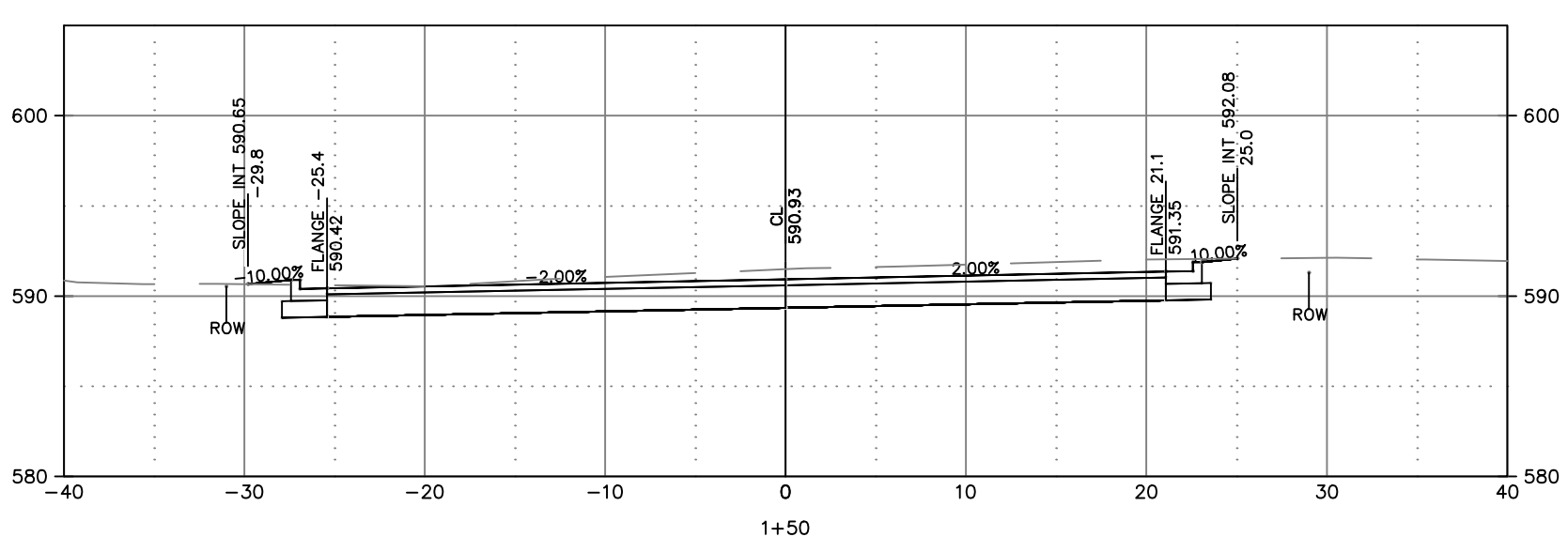
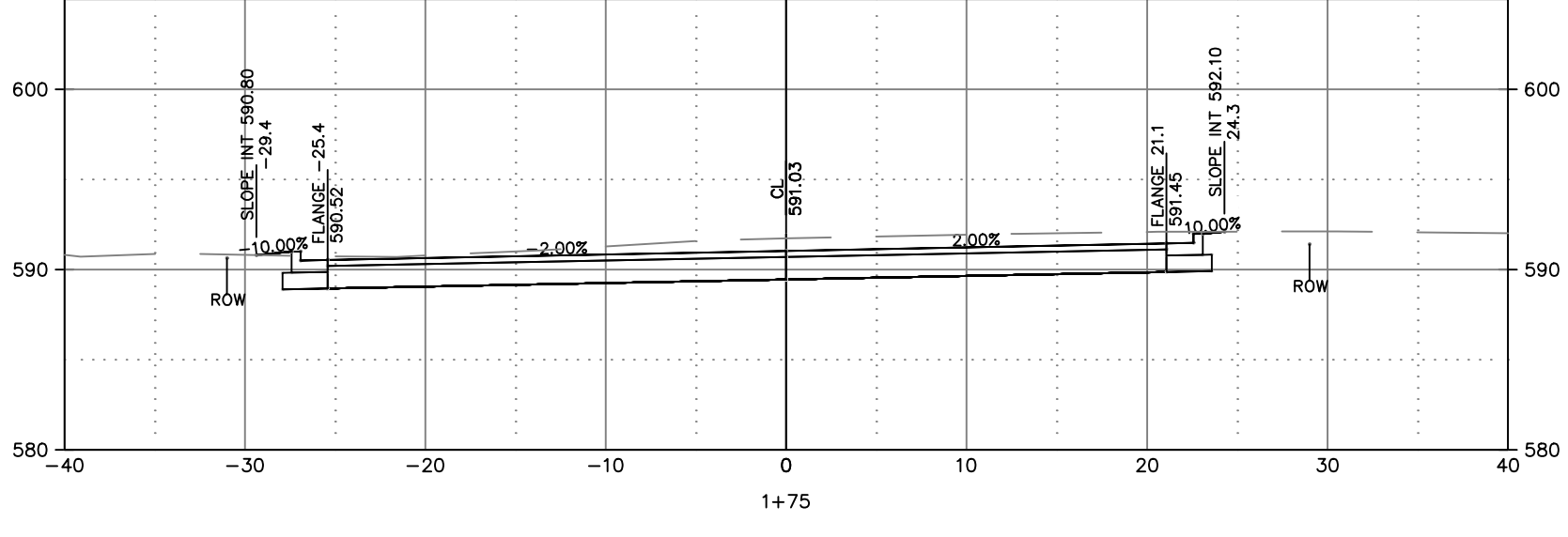
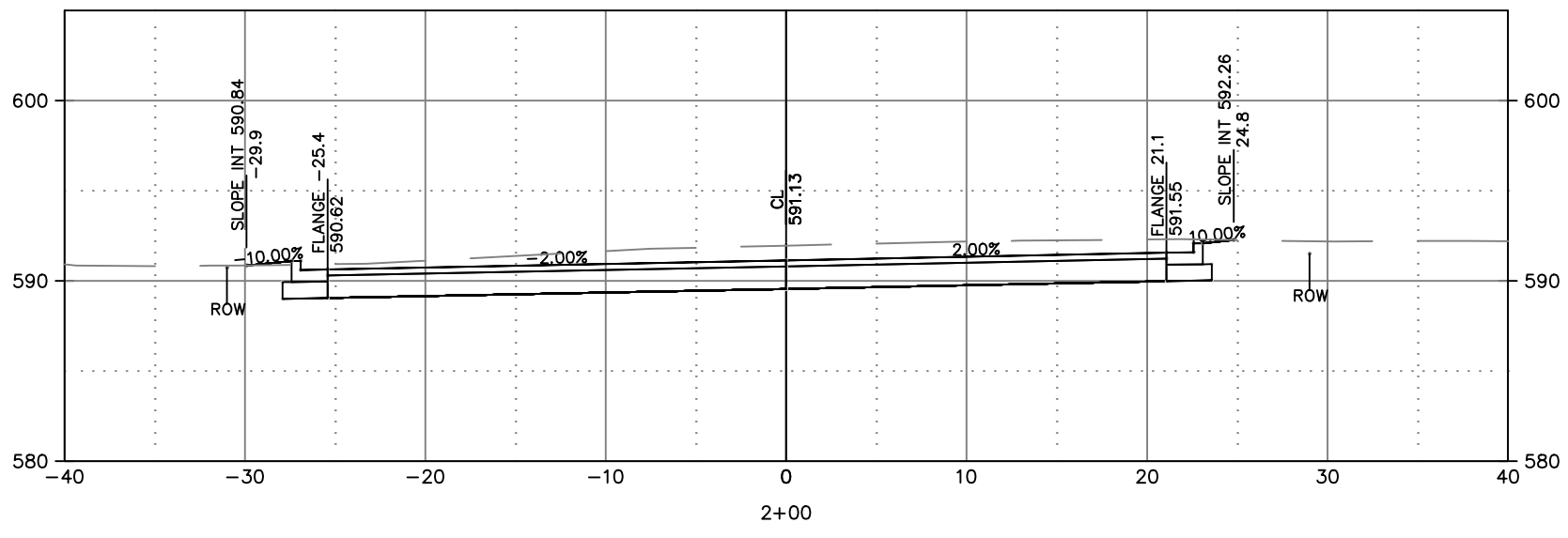
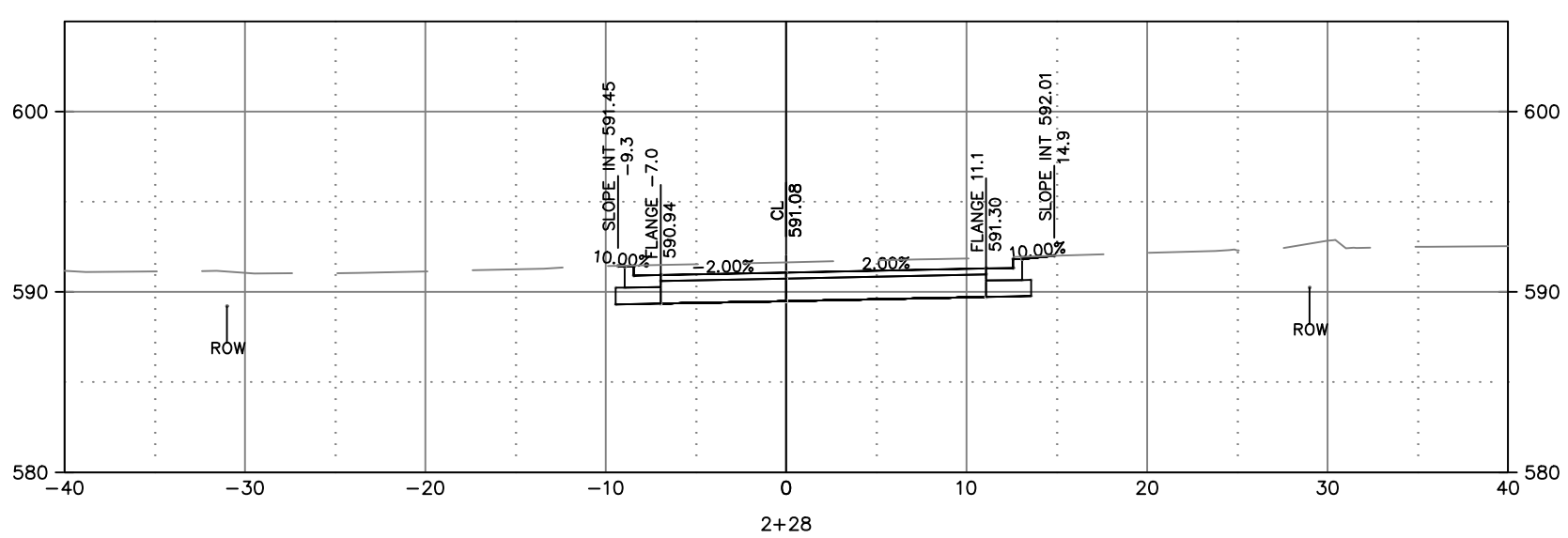
CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

FRONT STREET PARKING
 CROSS SECTIONS

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

DATE	BY	DESIGNED	CHECKED
09-2019	SRL	SRL	SRL
09-2019	SRL	SRL	SRL
01-2020	SRL/KAD	SRL	EPB

NO.	DATE	REVISIONS / ISSUES	REMARKS





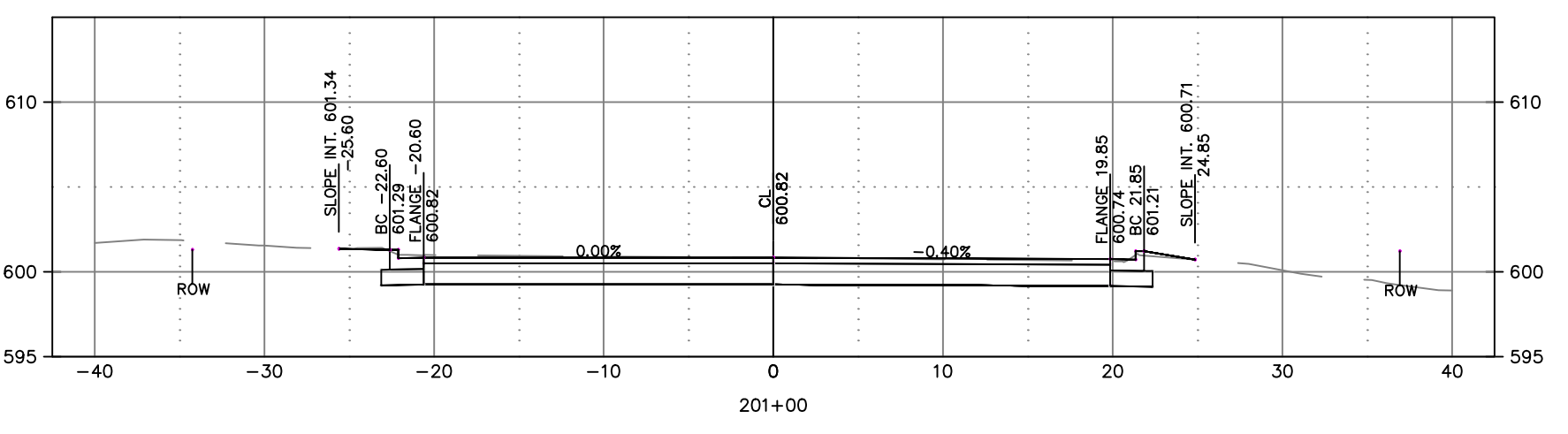
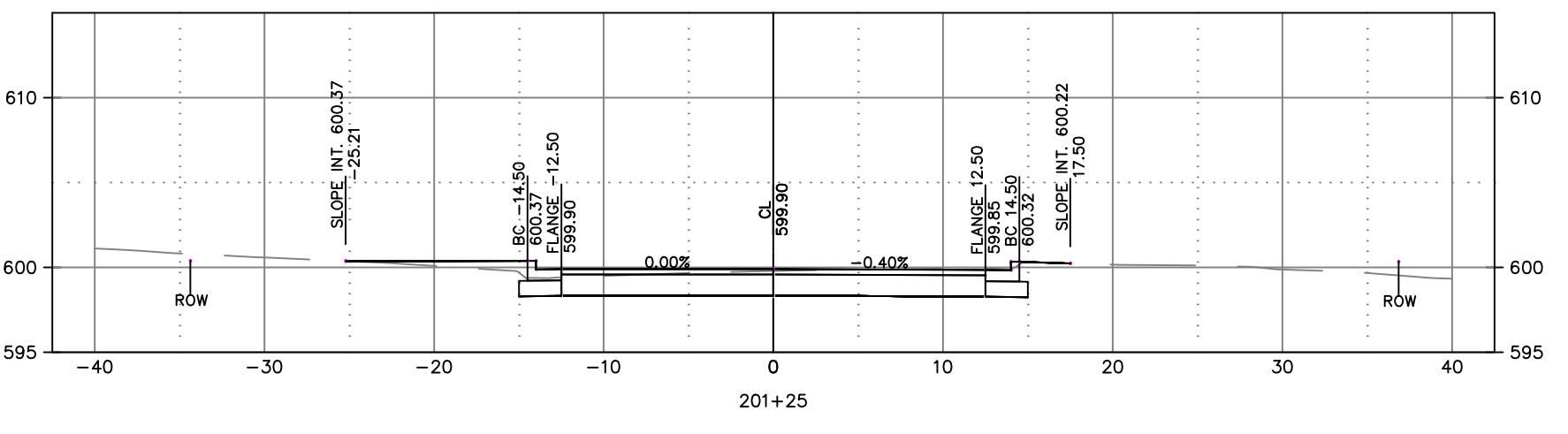
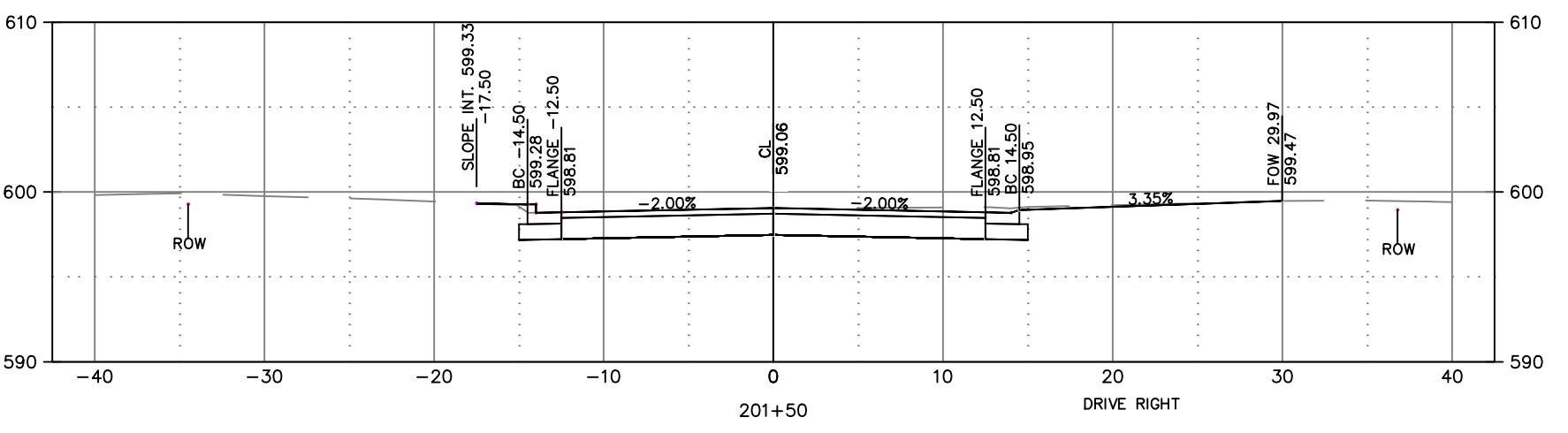
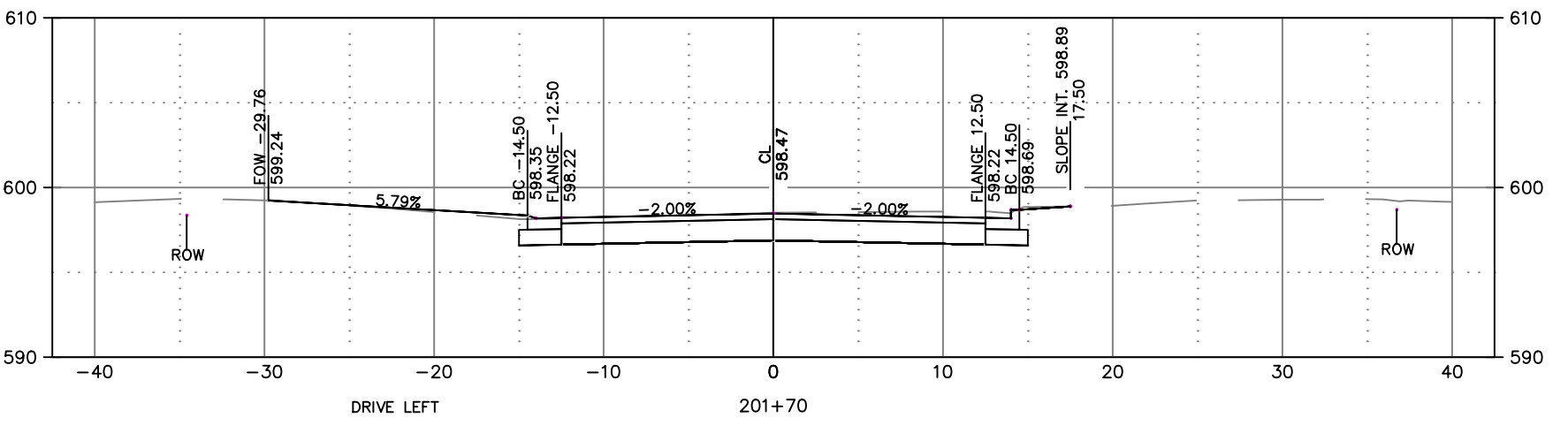
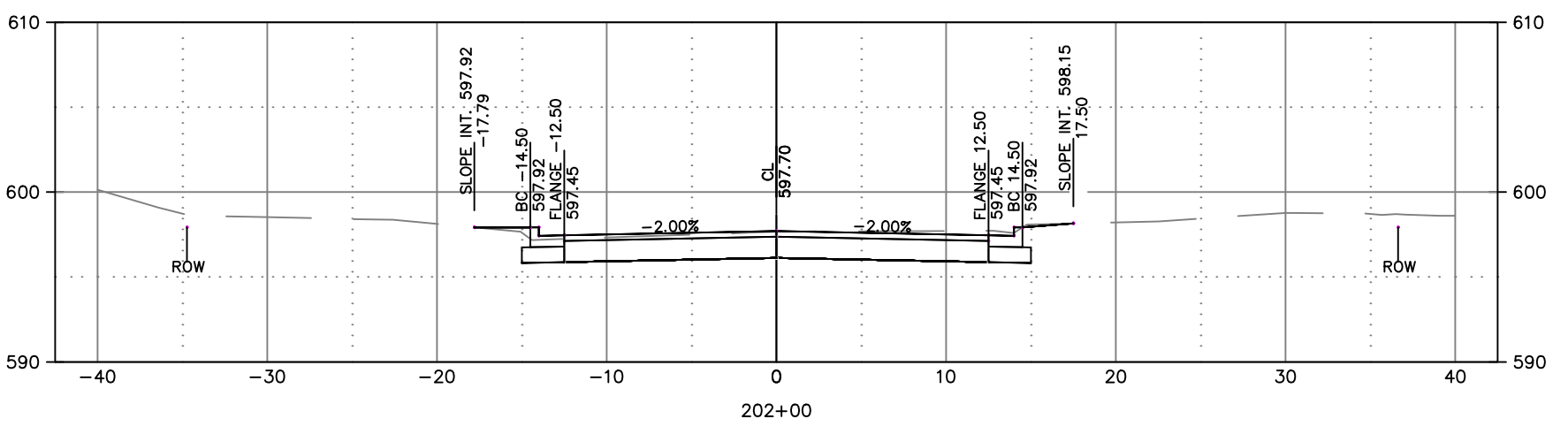
CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

COLLEGE AVENUE
 CROSS SECTIONS

NAME: STREET RECONSTRUCTION AND
 UTILITY RELAY
 PROJECT # 20-02

DATE	BY	NO.
12-2018	KAD	
01-2019	KAD	
01-2019	ERR	

DATE	BY	REMARKS





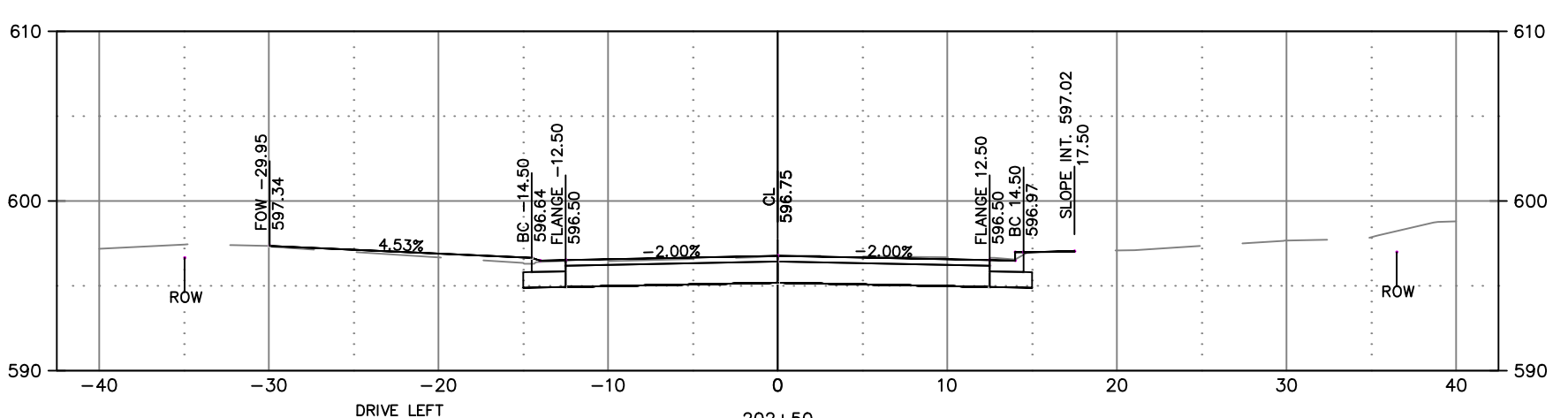
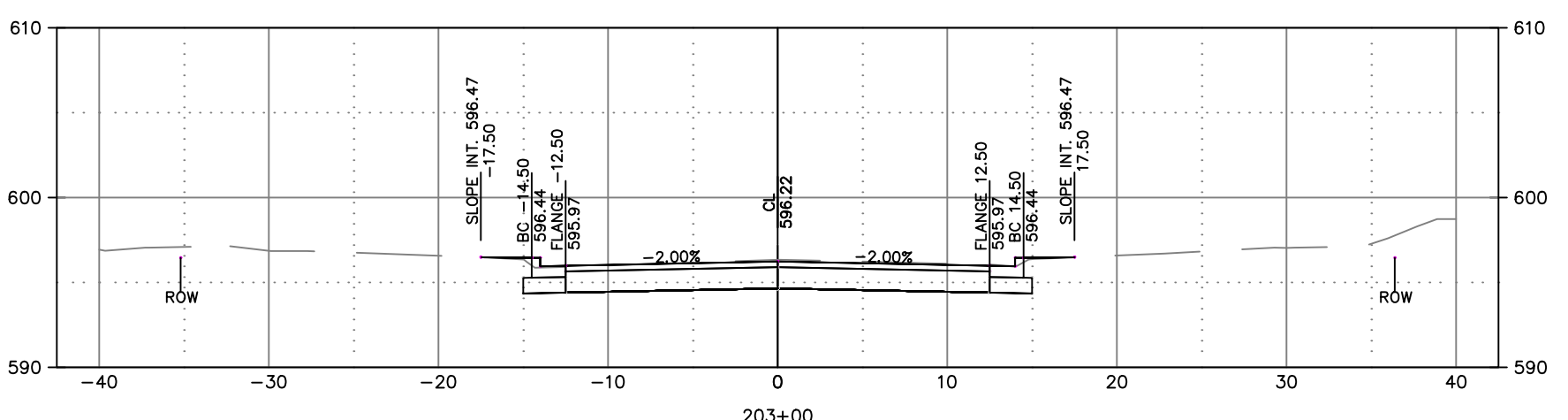
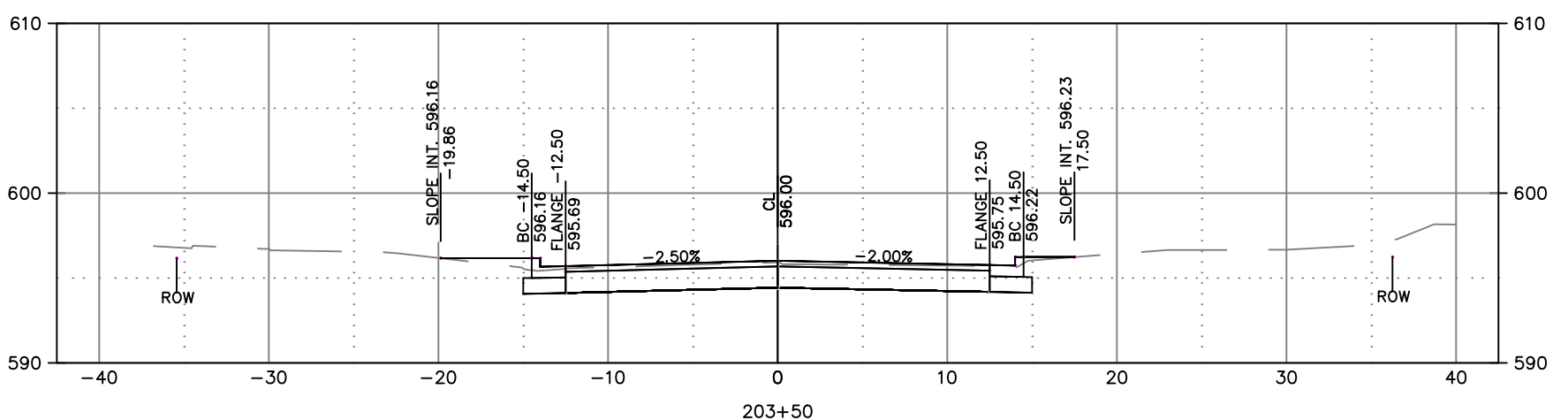
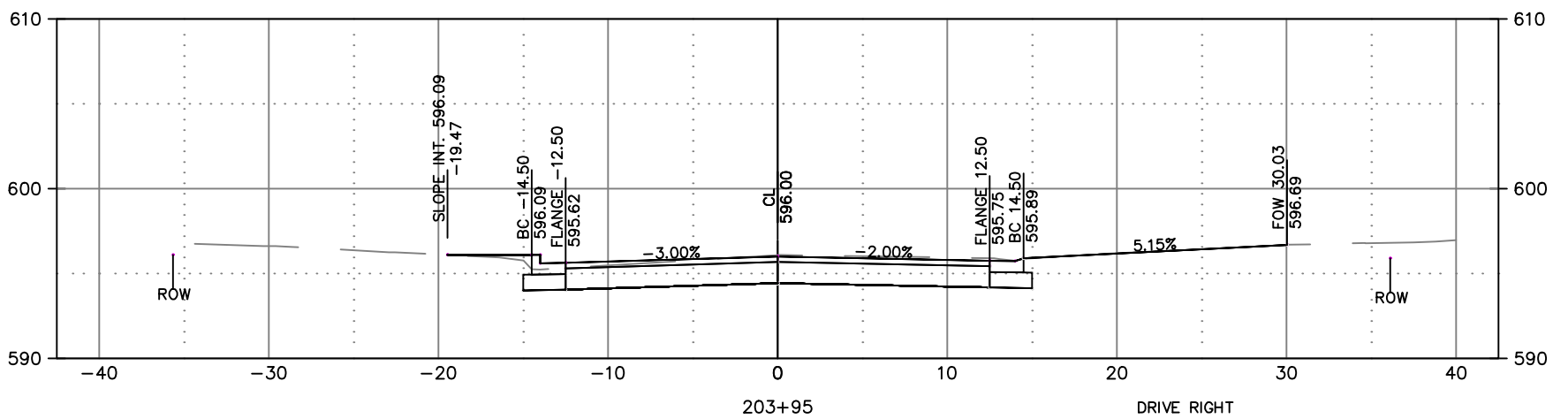
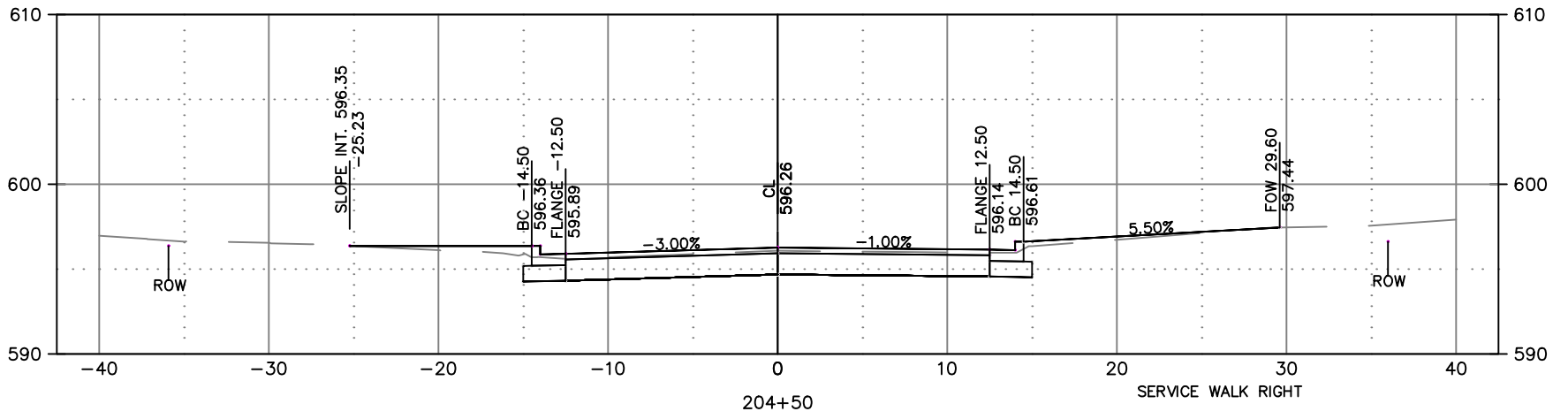
CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

COLLEGE AVENUE
 CROSS SECTIONS

NAME: STREET RECONSTRUCTION AND
 UTILITY RELAY
 PROJECT # 20-02

DATE	BY	NO.	DATE
12-2018	KAD		
12-2018	KAD		
01-2019	KAD		
01-2019	ERR		

REVISIONS / ISSUES	NO.	DATE	BY	REMARKS





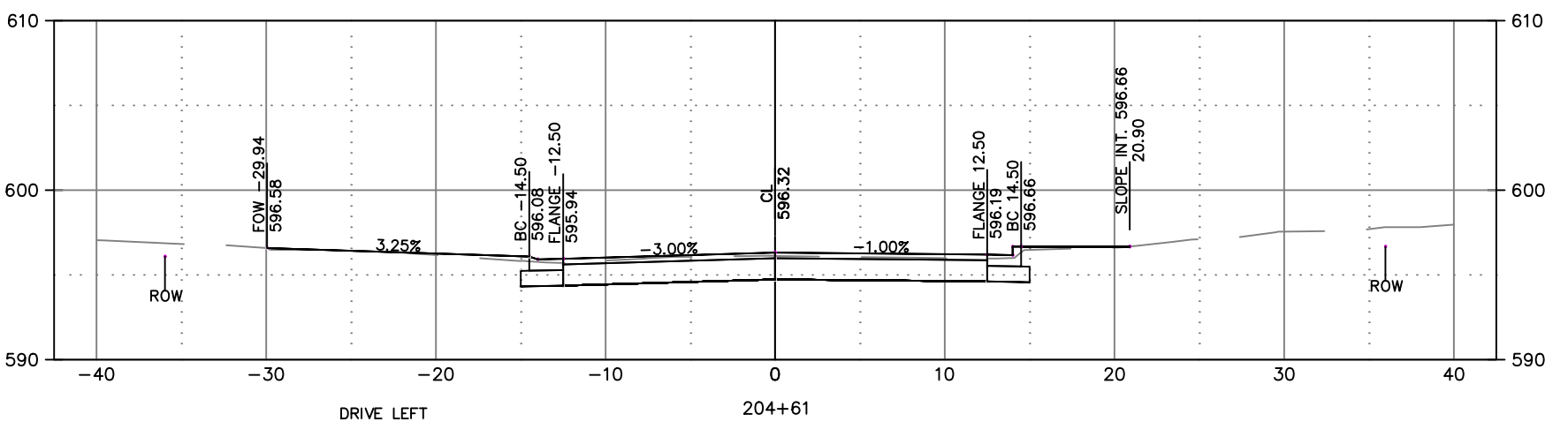
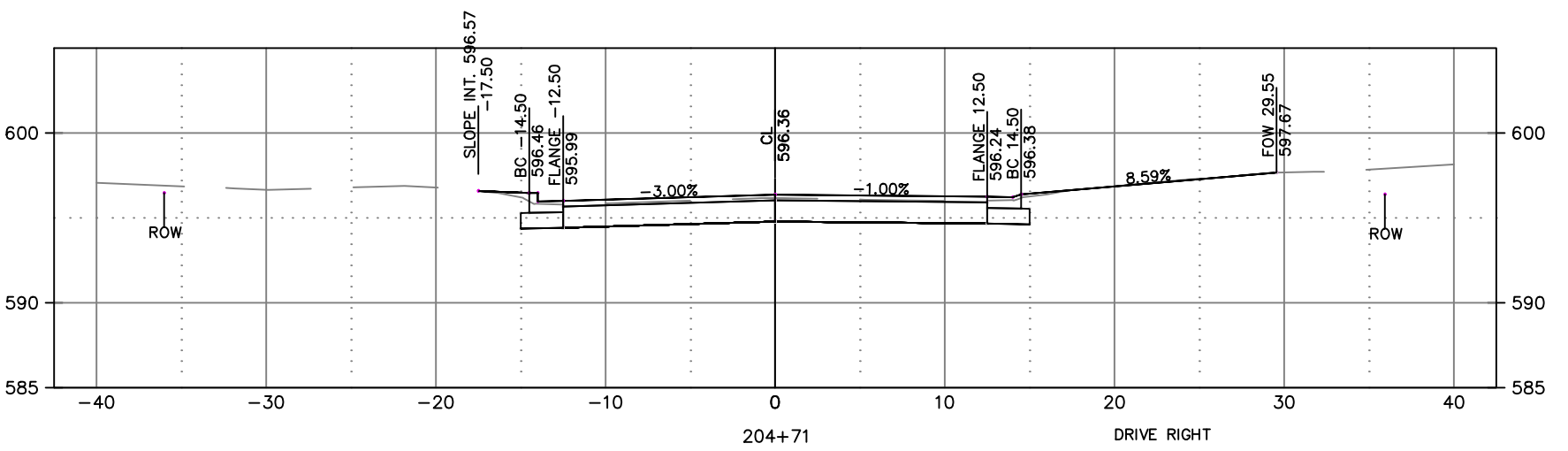
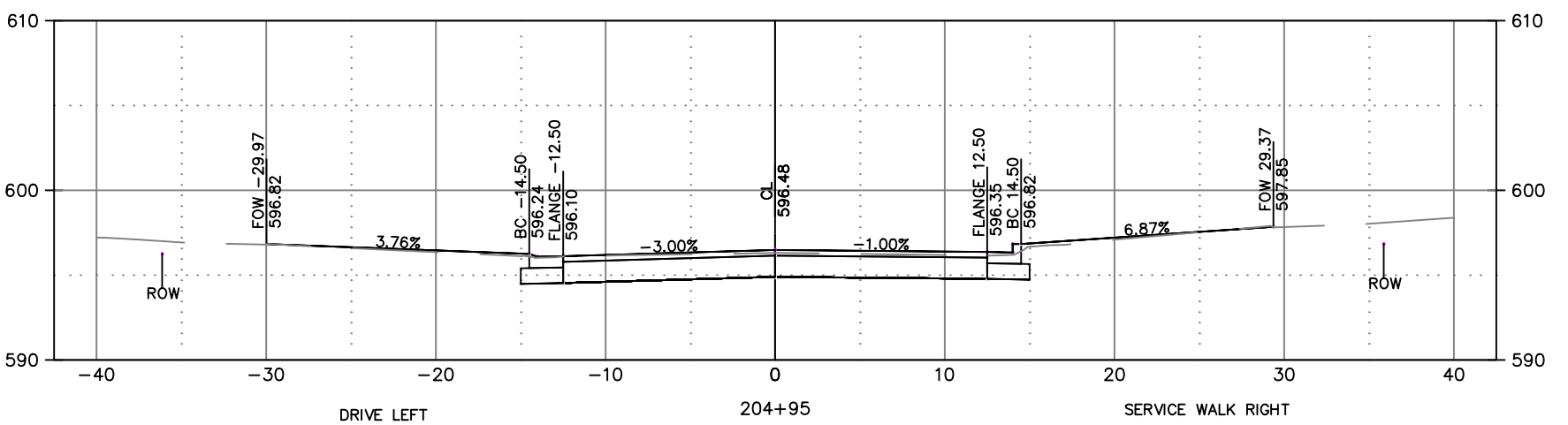
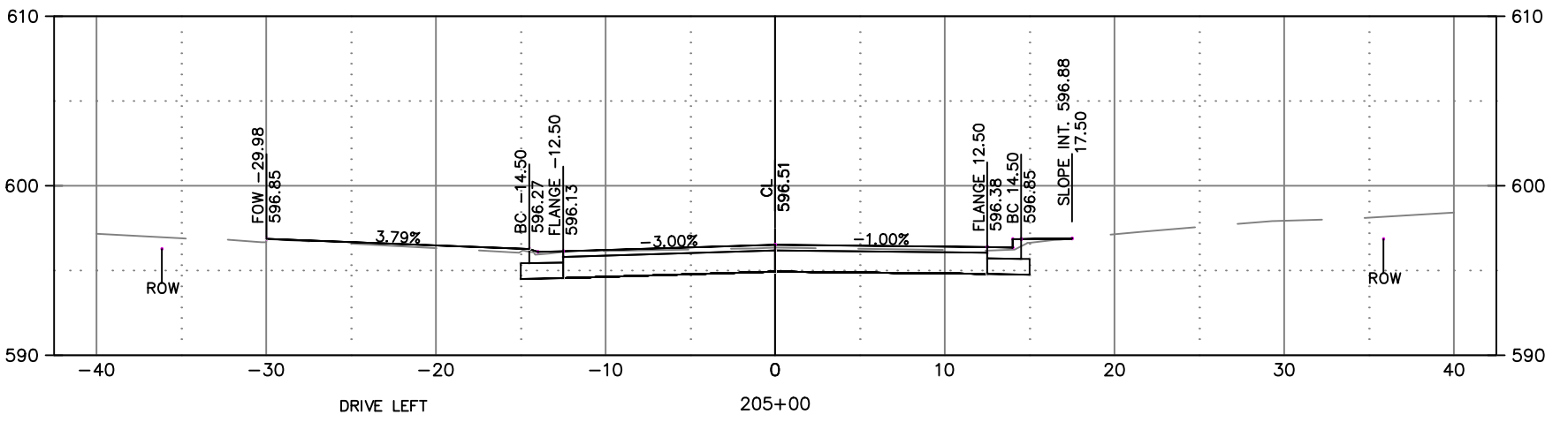
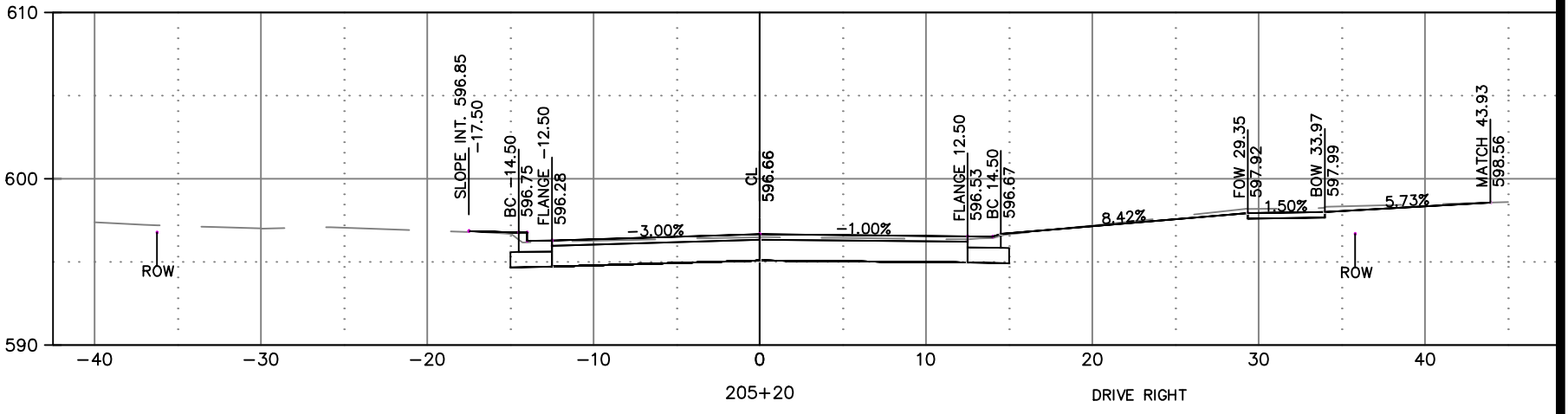
CITY OF DE PERE
 ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

COLLEGE AVENUE
CROSS SECTIONS

NAME: STREET RECONSTRUCTION AND
 UTILITY RELAY
 PROJECT # 20-02

DATE	BY	CHKD
12-2018	KAD	KAD
12-2018	KAD	KAD
01-2019	KAD	KAD
01-2019	ERR	ERR

NO.	DATE	BY	REMARKS / ISSUES





DE PERE

CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115

OFFICE 920-339-4061 FAX 920-339-4071

COLLEGE AVENUE

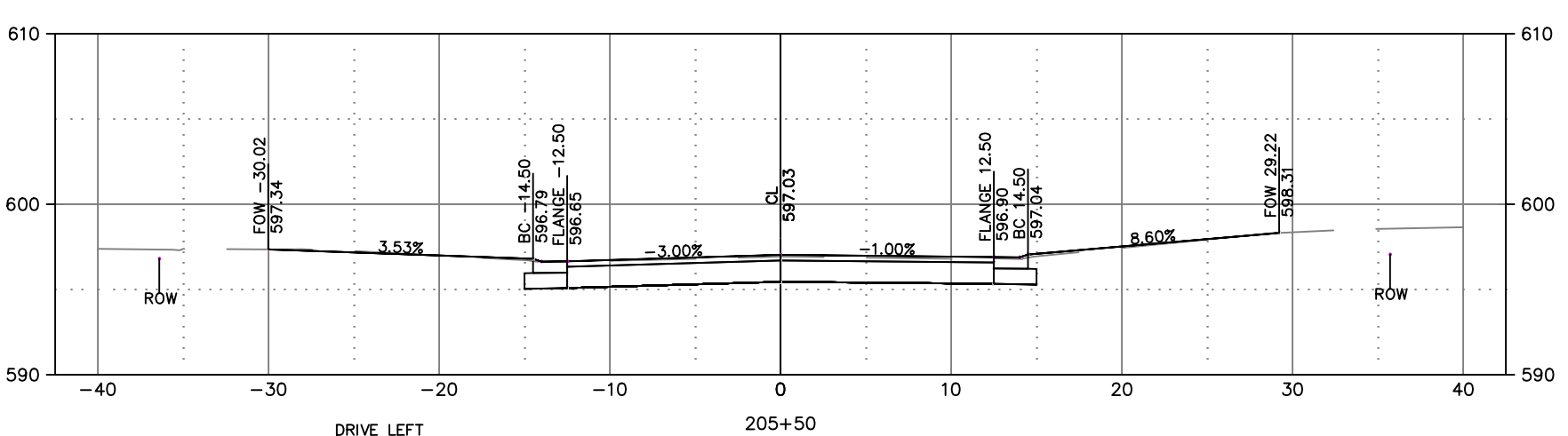
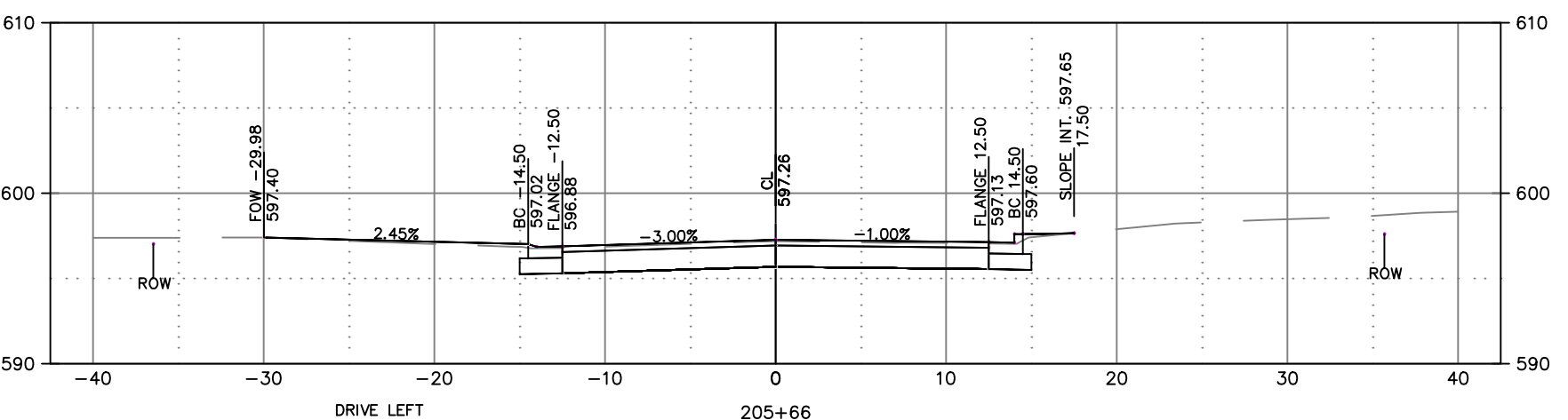
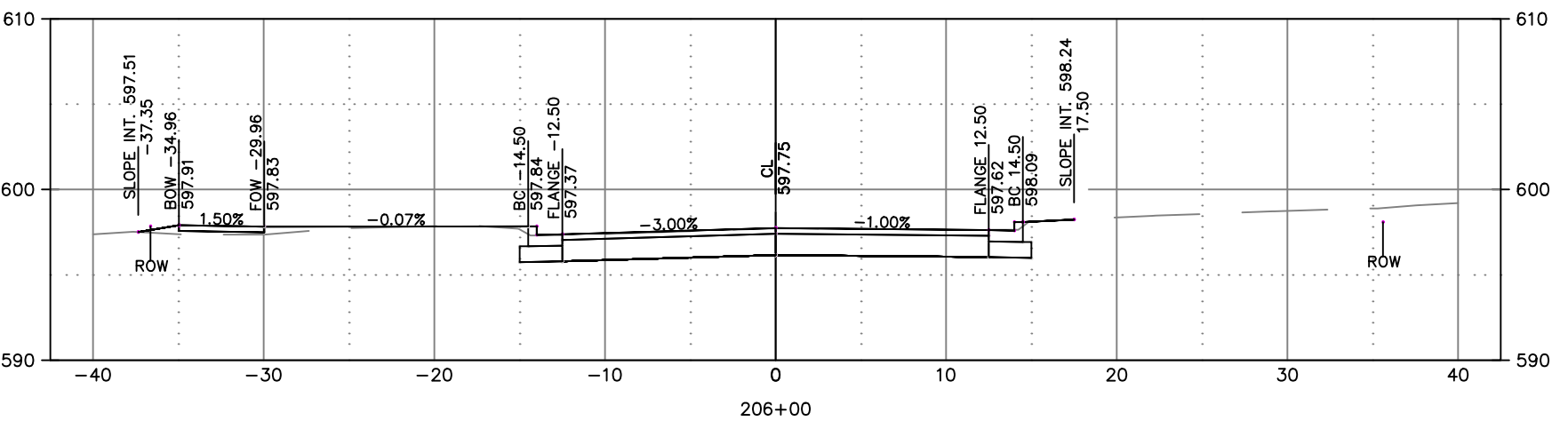
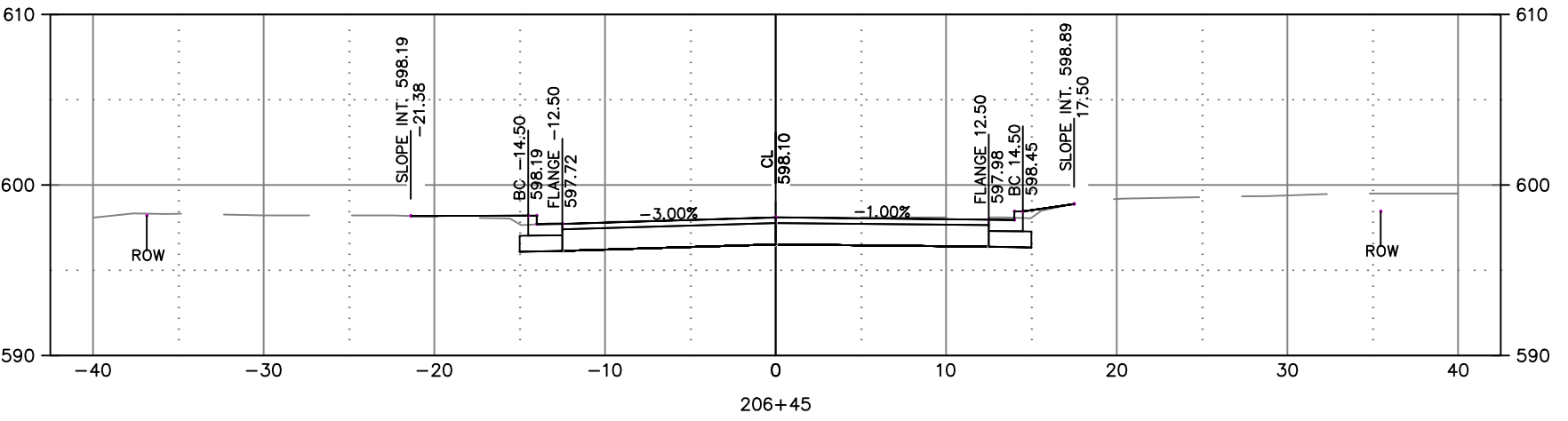
CROSS SECTIONS

NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02

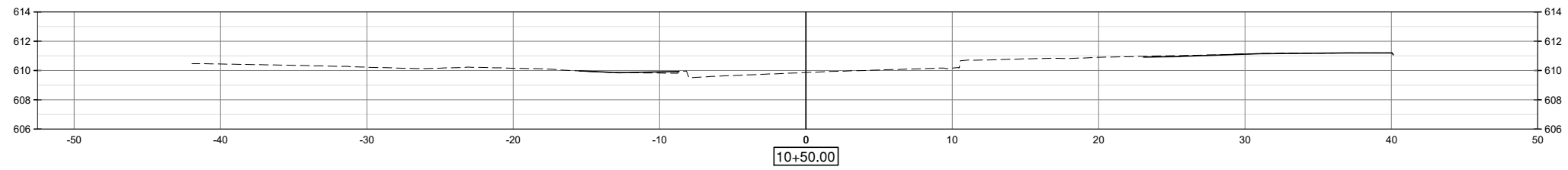
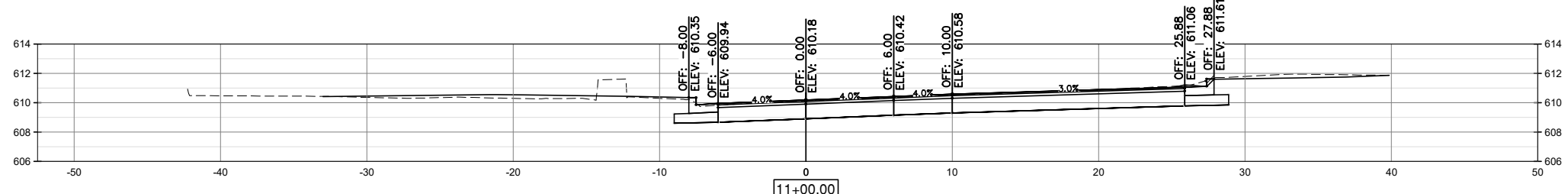
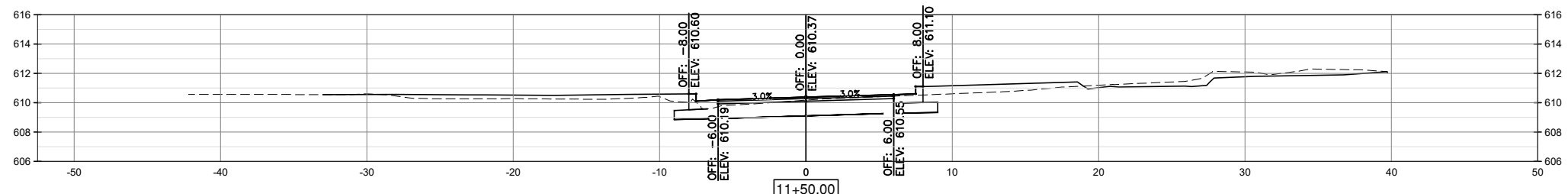
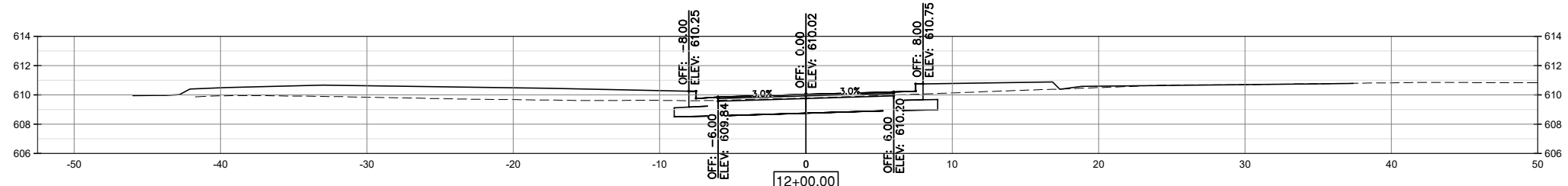
DATE	BY	NO.
12-2018	KAD	
12-2018	KAD	
01-2019	KAD	
01-2019	ERR	

DATE	BY	REMARKS

PAGE NO. C308



X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James\C300_X-SECTIONS
2/17/2020 12:56 PM



1150 Springhurst Drive,
Suite 201
Green Bay, WI 54304-5947
920 / 592 9440
920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND
UTILITY RELAY

400 James Street
De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted

SHEET TITLE:

CROSS SECTIONS

SHEET NUMBER:

C309

X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James\C300_X-SECTIONS
2/17/2020 12:57 PM



1150 Springhurst Drive,
Suite 201
Green Bay, WI 54304-5947
920 / 592 9440
920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND
UTILITY RELAY

400 James Street
De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

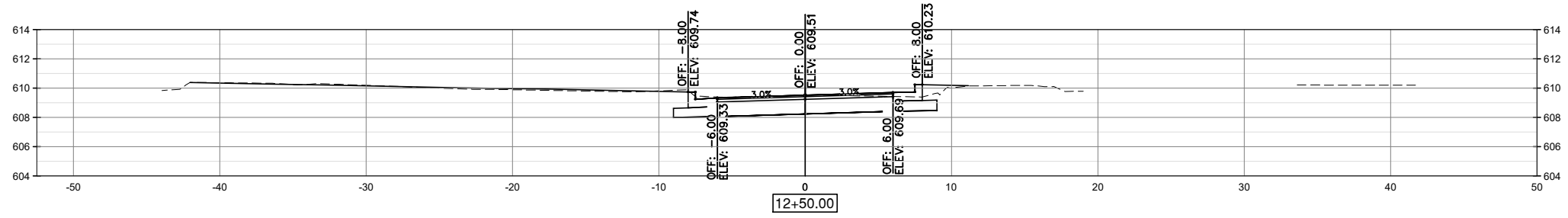
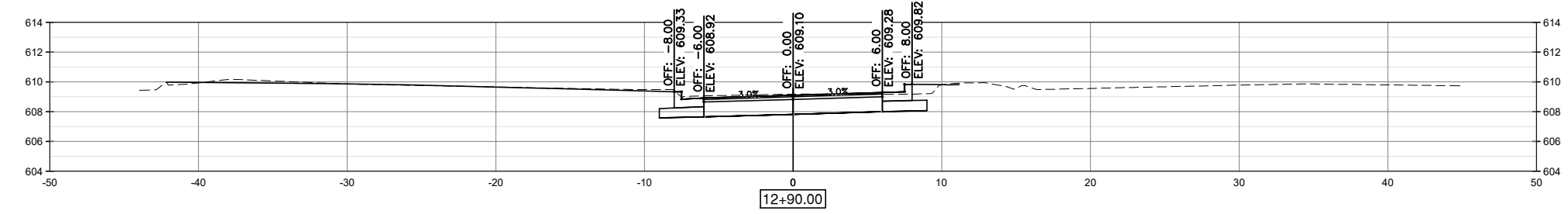
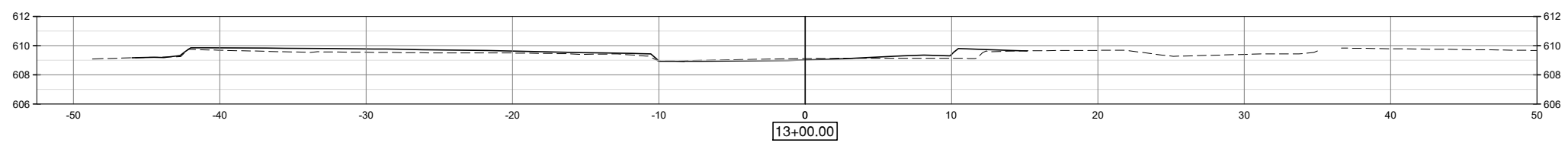
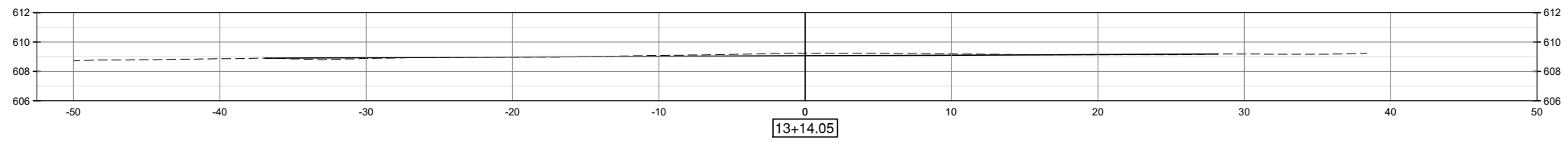
PROJECT INFORMATION:

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted

SHEET TITLE:

CROSS SECTIONS

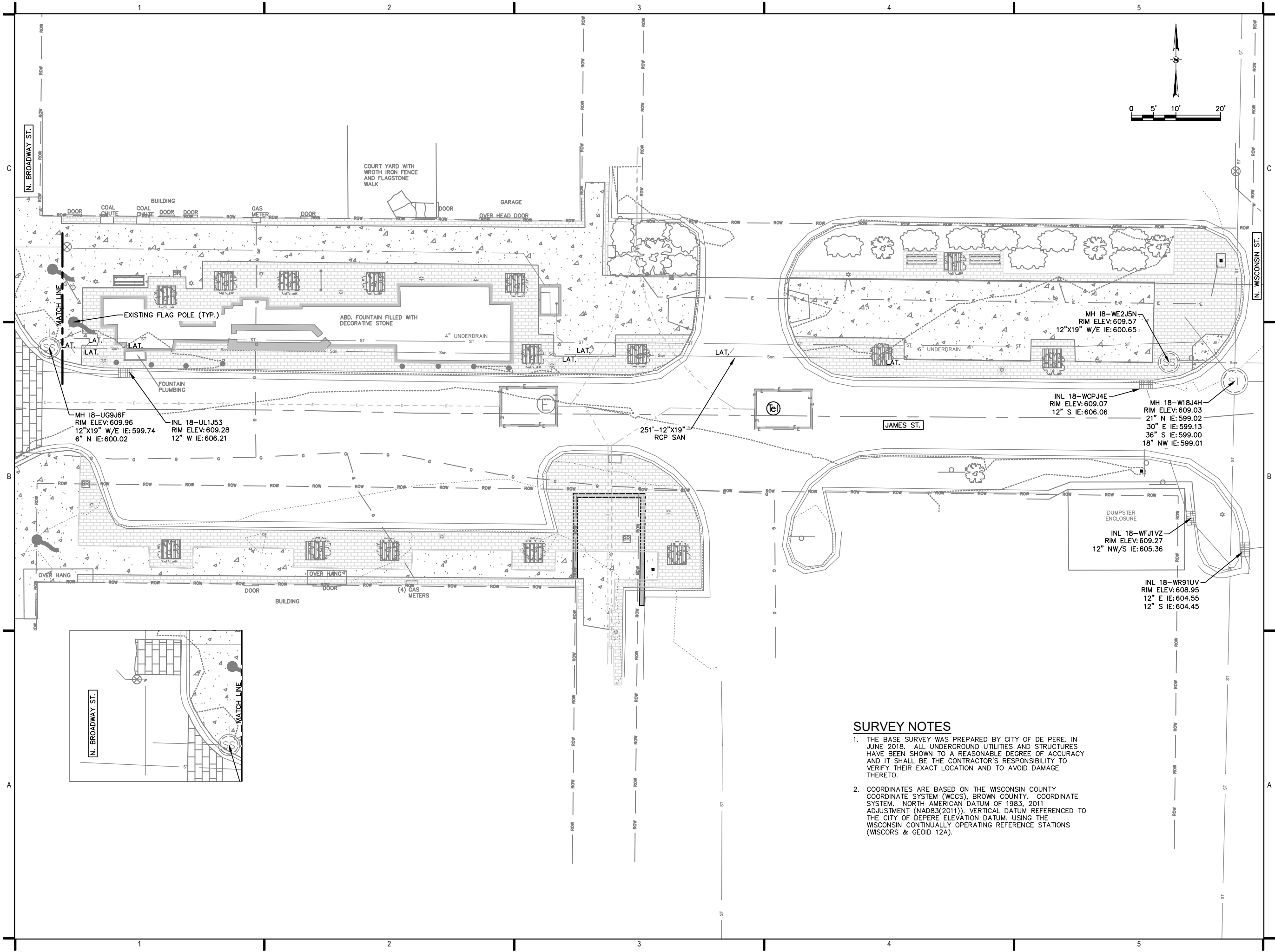
SHEET NUMBER:



C310

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER:	2018-1013
DATE:	03-28-19
DRAWN BY:	CEP
CHECKED BY:	RPV
APPROVED BY:	PJS
SCALE:	As Noted

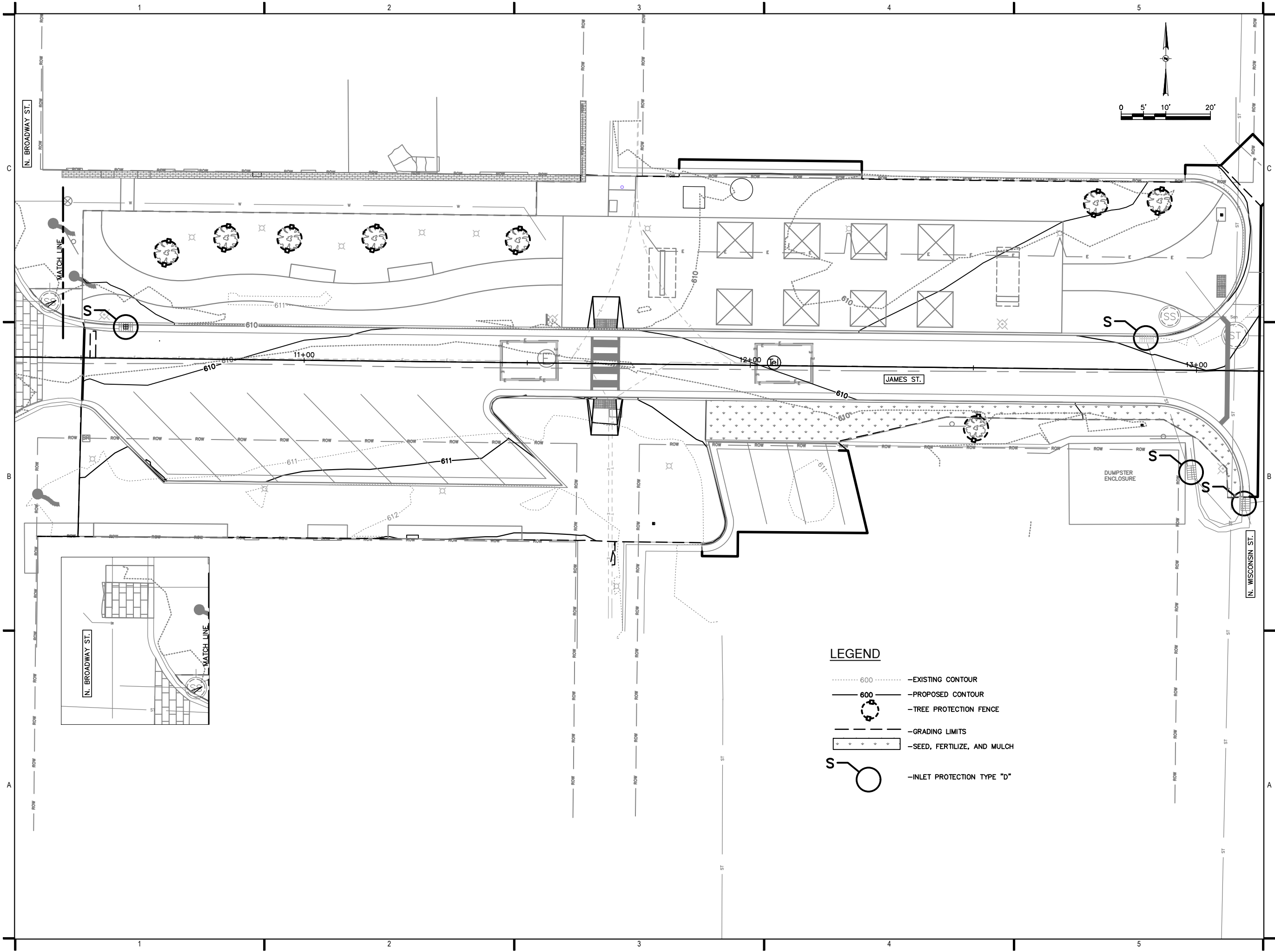


SURVEY NOTES

1. THE BASE SURVEY WAS PREPARED BY CITY OF DE PERE, IN JUNE 2018. ALL UNDERGROUND UTILITIES AND STRUCTURES HAVE BEEN SHOWN TO A REASONABLE DEGREE OF ACCURACY AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THEIR EXACT LOCATION AND TO AVOID DAMAGE THERETO.
2. COORDINATES ARE BASED ON THE WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), BROWN COUNTY, COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983, 2011 ADJUSTMENT (NAD83(2011)). VERTICAL DATUM REFERENCED TO THE CITY OF DEPERE ELEVATION DATUM, USING THE WISCONSIN CONTINUALLY OPERATING REFERENCE STATIONS (WISCORS & GEOID 12A).

X:\ENGINE\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James C400 Topo 2/17/2020 1:04 PM

X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James\C401 EROSION CONTROL
2/17/2020 1:05 PM



GRAEF

1150 Springhurst Drive,
Suite 201
Green Bay, WI 54304-5947
920 / 592 9440
920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND
UTILITY RELAY

400 James Street
De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

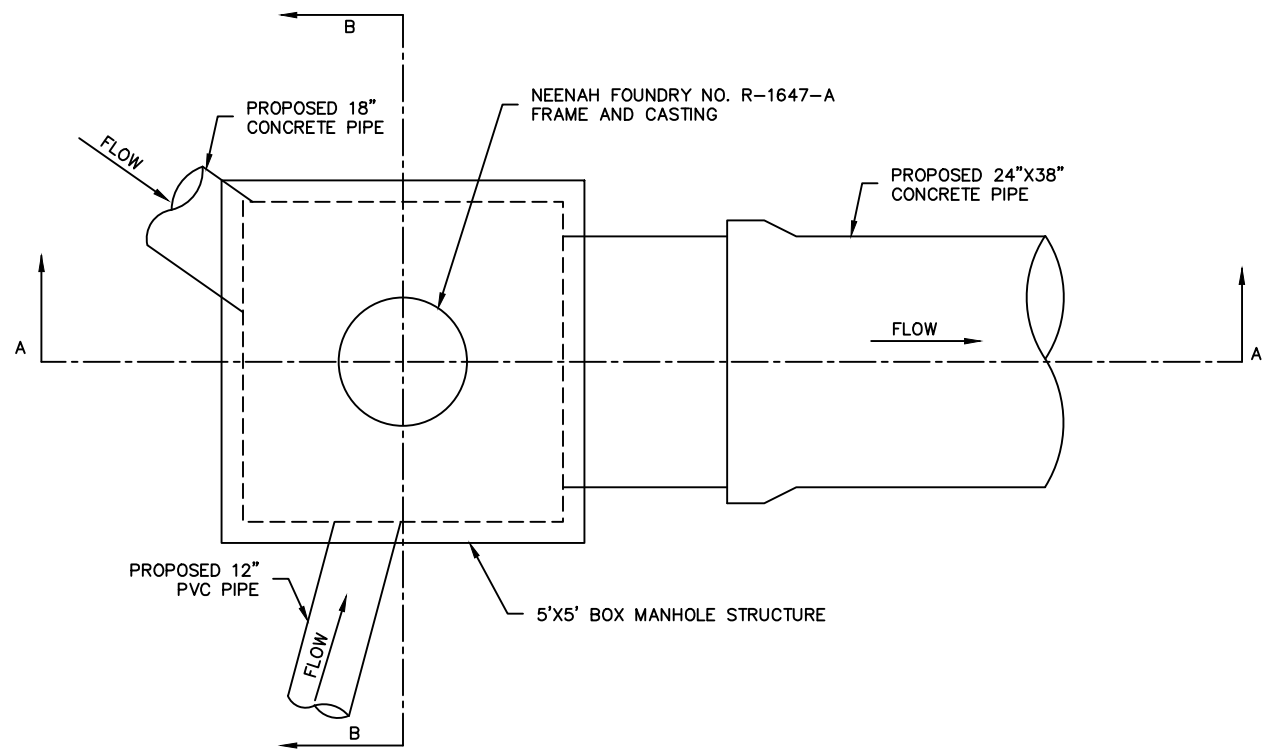
PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted

SHEET TITLE:

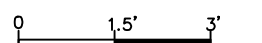
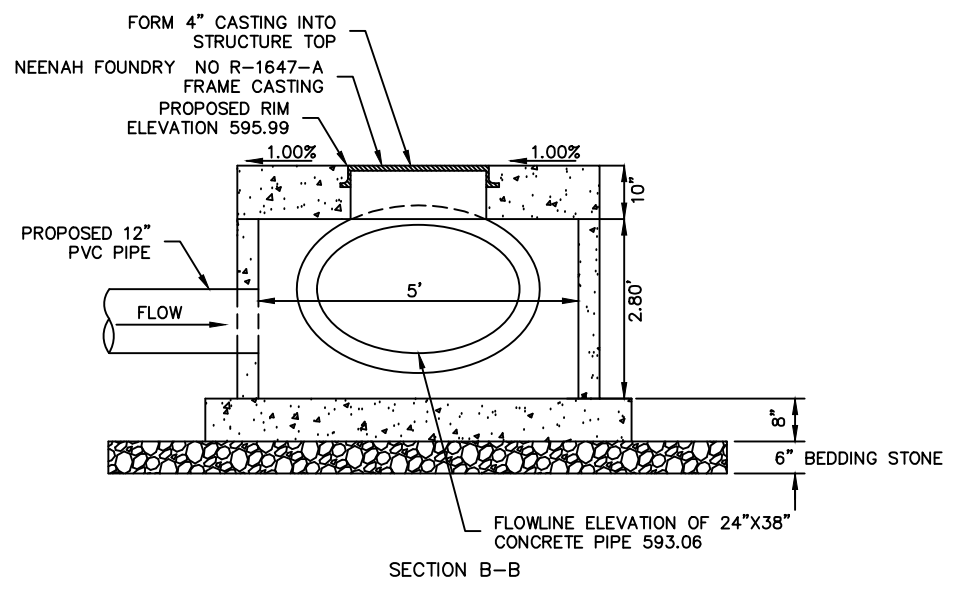
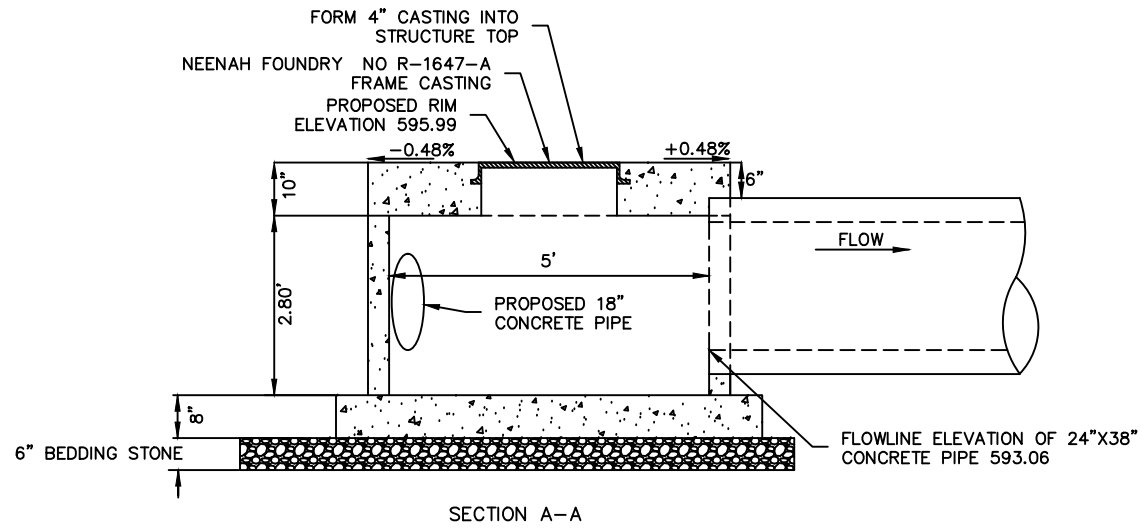
SITE EROSION CONTROL PLAN

SHEET NUMBER:

C401



NOTE:
 CLASS C CONCRETE SHALL BE IN ACCORDANCE WITH
 STANDARD SPECIFICATIONS FOR SEWER AND WATER
 CONSTRUCTION IN WISCONSIN.



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

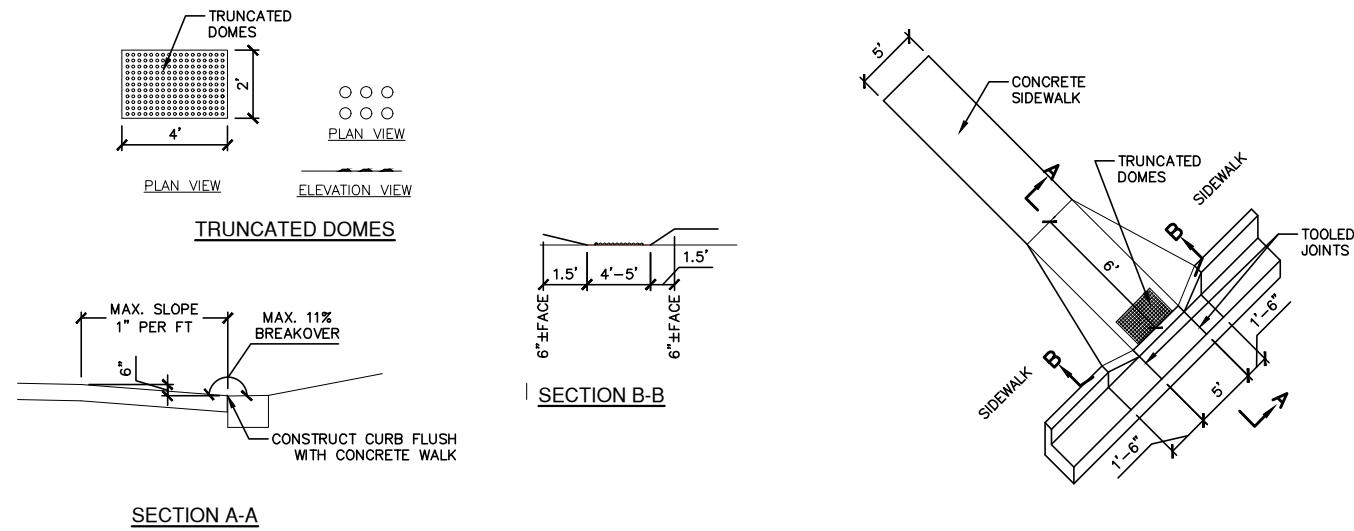
**CONSTRUCTION DETAIL
 5'X5' BOX MANHOLE
 STRUCTURE**

NAME: STREET RECONSTRUCTION AND
 UTILITY RELAY
 PROJECT # 20-02

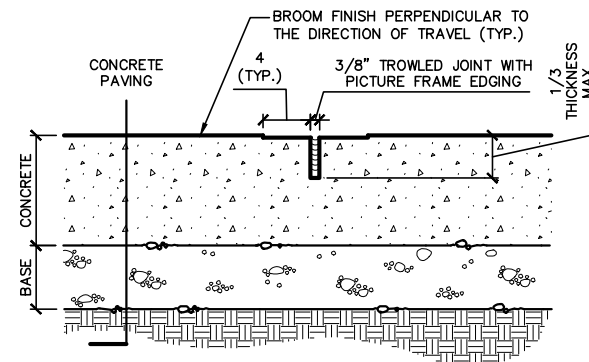
	BY	DATE
SURVEYED		
DRAWN	KAD	04-2019
DESIGNED	KAD	04-2019
CHECKED	EPR	04-2019

REVISIONS / ISSUES		
NO.	DATE	REMARKS

SHEET NO.
C500

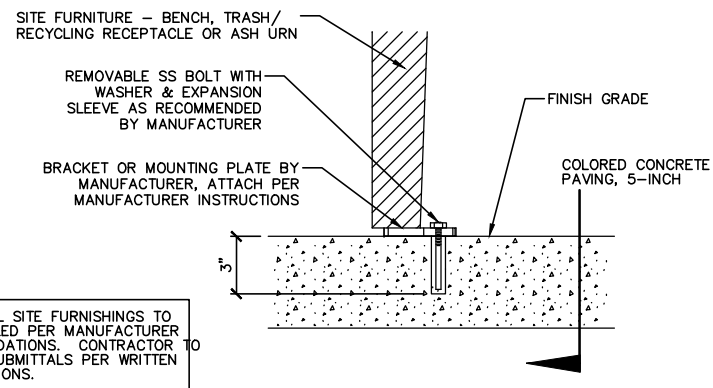


1 ADA RAMP
SCALE N.T.S.



REFER TO C115 FOR LOCATIONS OF PICTURE FRAMED CONTROL JOINTS (LARGE PLAZA PANELS ONLY, 88043-88154 EAST). CONTROL JOINTS FOR CONCRETE HEADER (PANELS ≤1.5 FT WIDTH) TO NOT HAVE PICTURE FRAMING.

2 PICTURE FRAMED CONTROL JOINT
SCALE N.T.S.

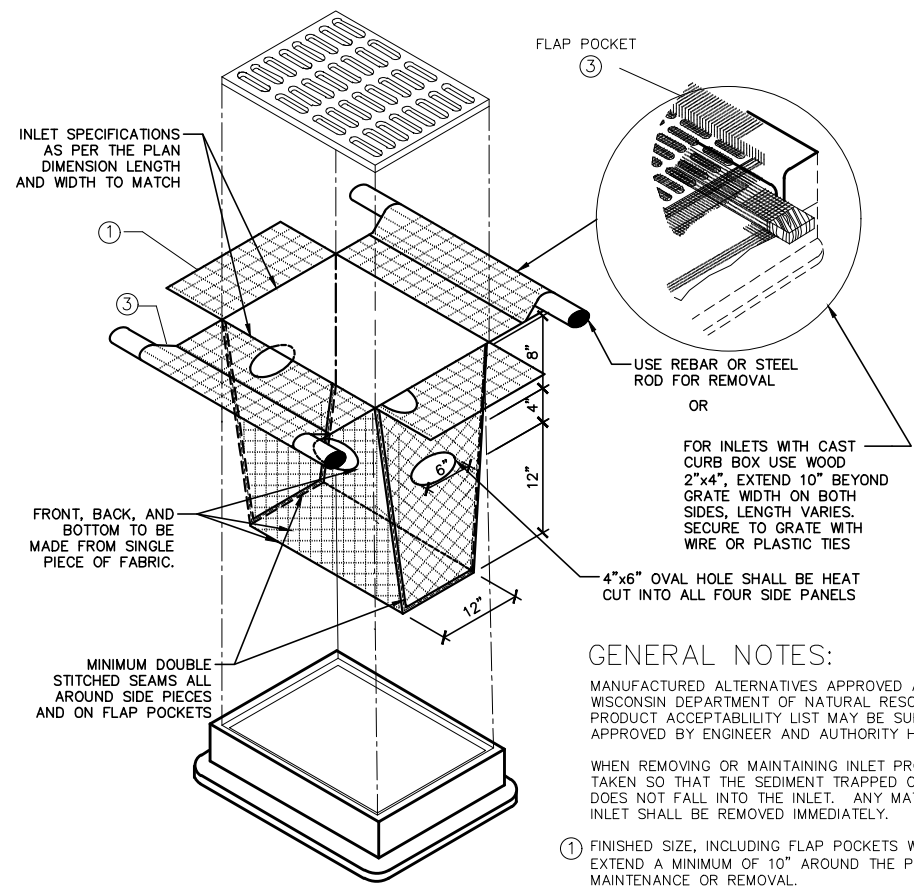


NOTE: ALL SITE FURNISHINGS TO BE INSTALLED PER MANUFACTURER RECOMMENDATIONS. CONTRACTOR TO PROVIDE SUBMITTALS PER WRITTEN SPECIFICATIONS.

3 SITE FURNITURE MOUNTING AT COLORED CONCRETE PAVING
SCALE N.T.S.

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: CEP
CHECKED BY: RPV
APPROVED BY: PJS
SCALE: As Noted



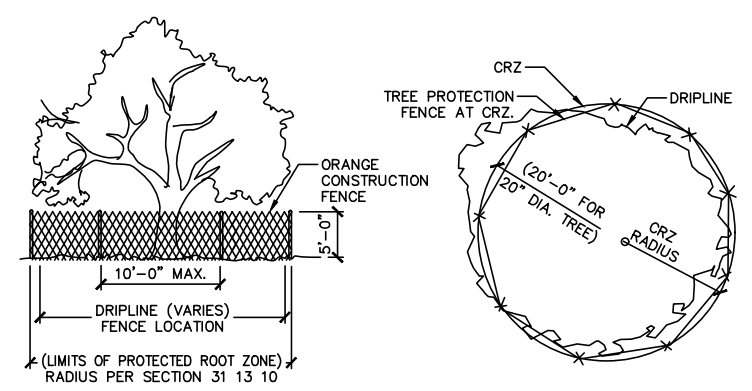
GENERAL NOTES:

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED WHEN APPROVED BY ENGINEER AND AUTHORITY HAVING JURISDICTION.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

- FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
- FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.

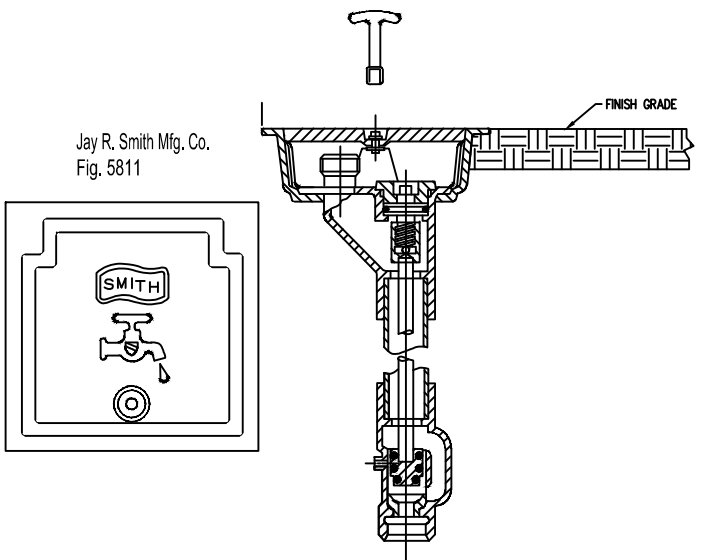
1 INLET PROTECTION, TYPE D
SCALE N.T.S.



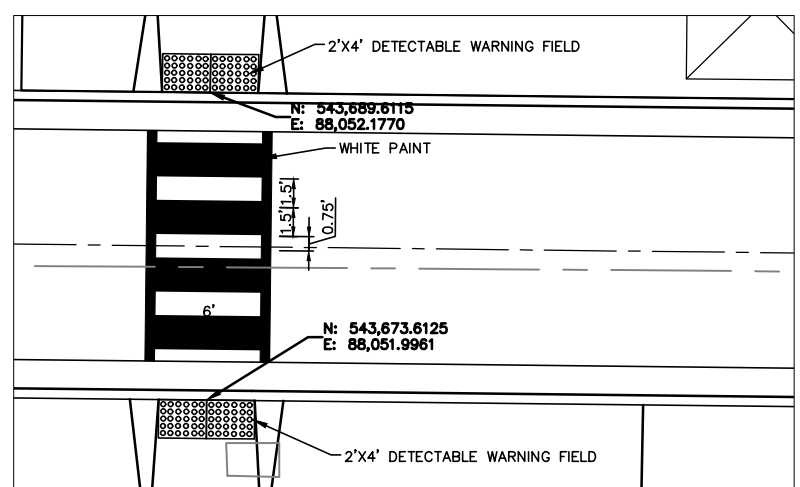
TREE PROTECTION FENCE - ORANGE CONSTRUCTION FENCE

- ALL TREES SHOWN TO BE RETAINED WITHIN THE LIMITS OF CONSTRUCTION ON THE PLANS, SHALL BE PROTECTED DURING CONSTRUCTION WITH FENCING PER CITY SPECIFICATION 31 13 10 AND/OR AS DIRECTED BY THE CITY FORESTER.
- TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR GRADING).
- EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILD-UP WITHIN TREE DRIPLINES.
- FENCES SHALL COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES, LOCATED AT THE OUTERMOST LIMITS OF THE TREE BRANCHES (DRIPLINE) OR CRITICAL ROOT ZONE (CRZ), WHICHEVER IS GREATER; AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT.
- ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL AND BACKFILLED WITH GOOD QUALITY TOP SOIL WITHIN TWO DAYS. IF EXPOSED ROOT AREAS CANNOT BE BACKFILLED WITHIN 2 DAYS, AN ORGANIC MATERIAL WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION SHALL BE PLACED TO COVER THE ROOTS UNTIL BACKFILL CAN OCCUR.
- PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINES, A CLEAN CUT SHALL BE MADE WITH A ROCK SAW OR SIMILAR EQUIPMENT, TO MINIMIZE DAMAGE TO REMAINING ROOTS.
- NO LANDSCAPE TOPSOIL DRESSING GREATER THAN FOUR (4) INCHES SHALL BE PERMITTED WITHIN THE DRIPLINE OR CRZ OF TREES, WHICHEVER IS GREATER. NO TOPSOIL IS PERMITTED ON ROOT FLARES OF ANY TREE.
- PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND CONSTRUCTION EQUIPMENT SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS. ALL PRUNING MUST BE DONE AS OUTLINED IN LITERATURE PROVIDED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA PRUNING TECHNIQUES).

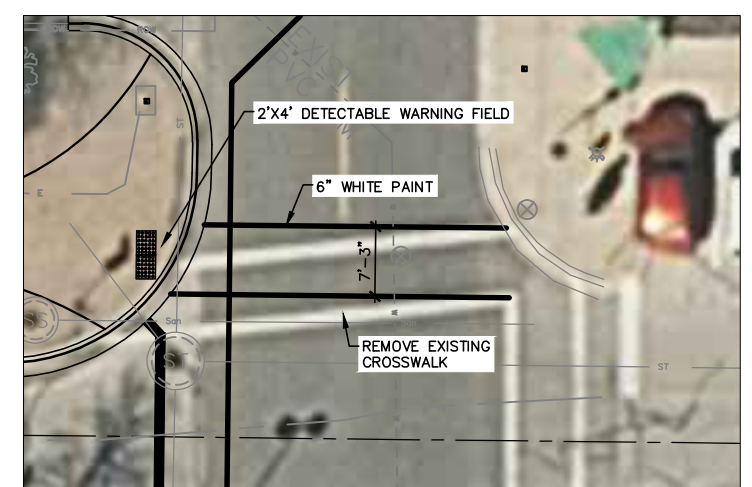
2 TREE PROTECTION
SCALE N.T.S.



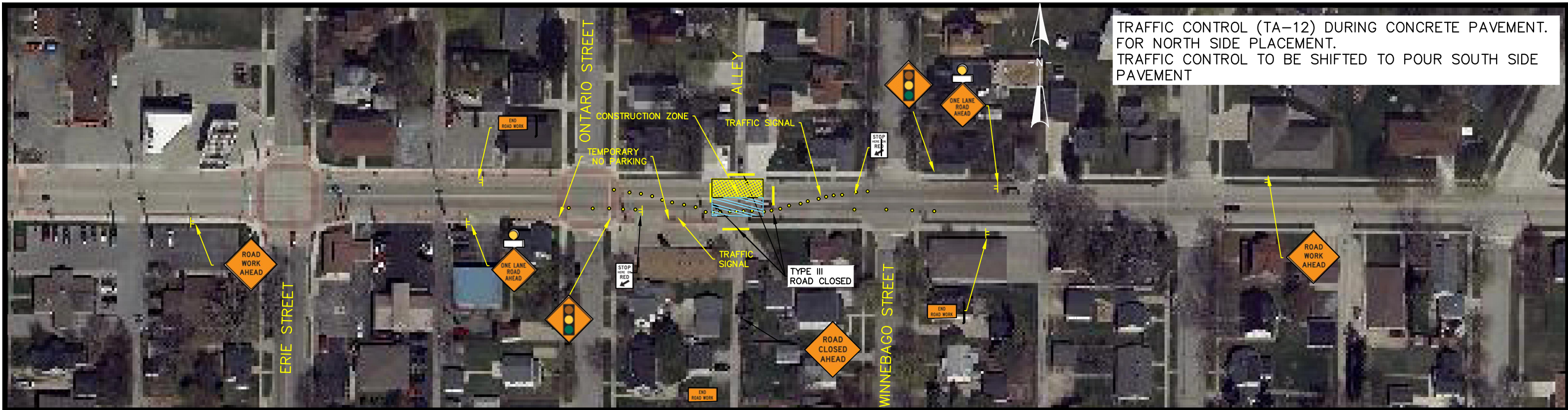
3 BOXED GROUND HYDRANT
SCALE N.T.S.



4 JAMES ST CROSSWALK DETAIL
SCALE N.T.S.



5 WISCONSIN ST CROSSWALK DETAIL
SCALE N.T.S.



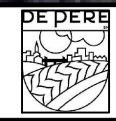
TRAFFIC CONTROL (TA-12) DURING CONCRETE PAVEMENT.
FOR NORTH SIDE PLACEMENT.
TRAFFIC CONTROL TO BE SHIFTED TO POUR SOUTH SIDE
PAVEMENT



TRAFFIC CONTROL
FOR SEWER
INSTALLATION

NOTE:
(2) FLAGPERSON WILL BE USED DURING THE INSTALLATION OF
STORM SEWER. ONCE STORM SEWER IS INSTALLED, COLD OR HOT
MIX ASPHALT WILL BE INSTALLED PRIOR OF OPENING UP
GEORGE ST.

LEGEND	
	TYPE III BARRICADE WITH ATTACHED SIGN
	SIGN ON TEMPORARY SUPPORT
	TUBULAR MARKERS



CITY OF DE PERE

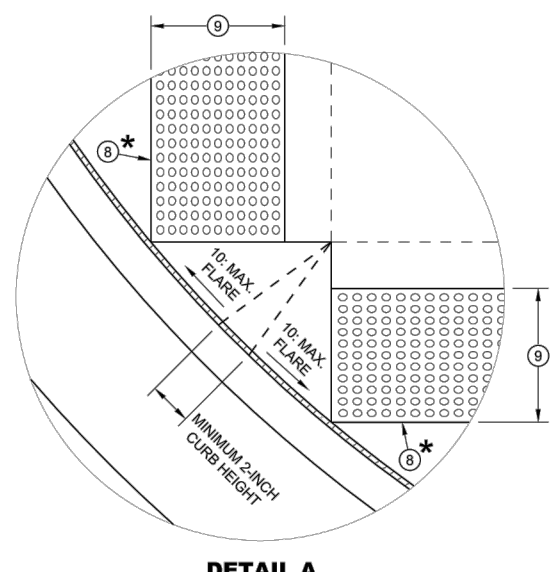
ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4060 FAX 920-339-4071

**ALLEY AND GEORGE ST
ROUTE
TRAFFIC CONTROL**

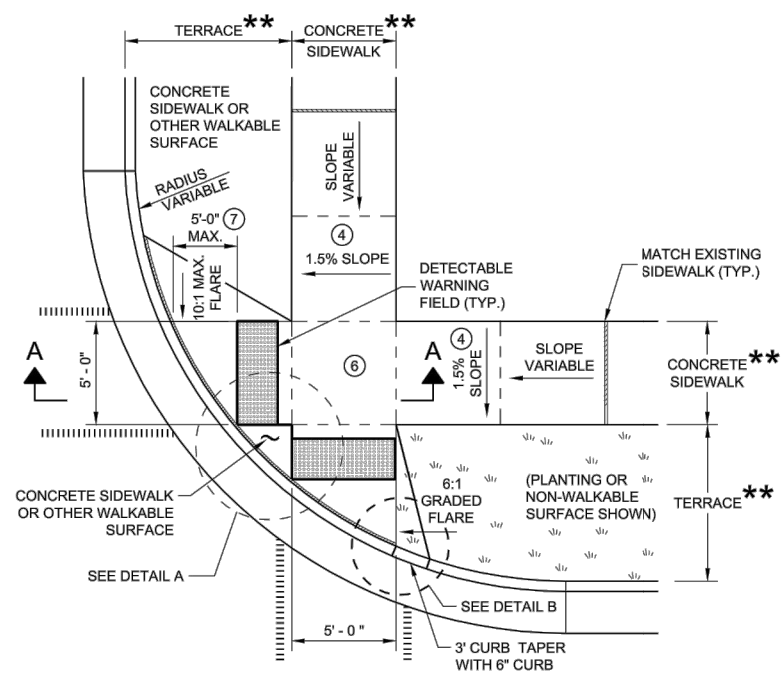
NAME: STREET RECONSTRUCTION AND UTILITY RELAY	BY	DATE	REVISIONS / ISSUES		PAGE NO. C504
PROJECT #			NO.	DATE	
20-02	KAD	02-2020	BY	REMARKS	
	EPR	02-2020			



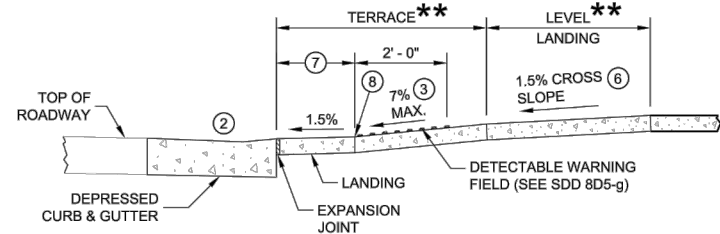
SDD 08D05-b Curb Ramps Types 2 and 3



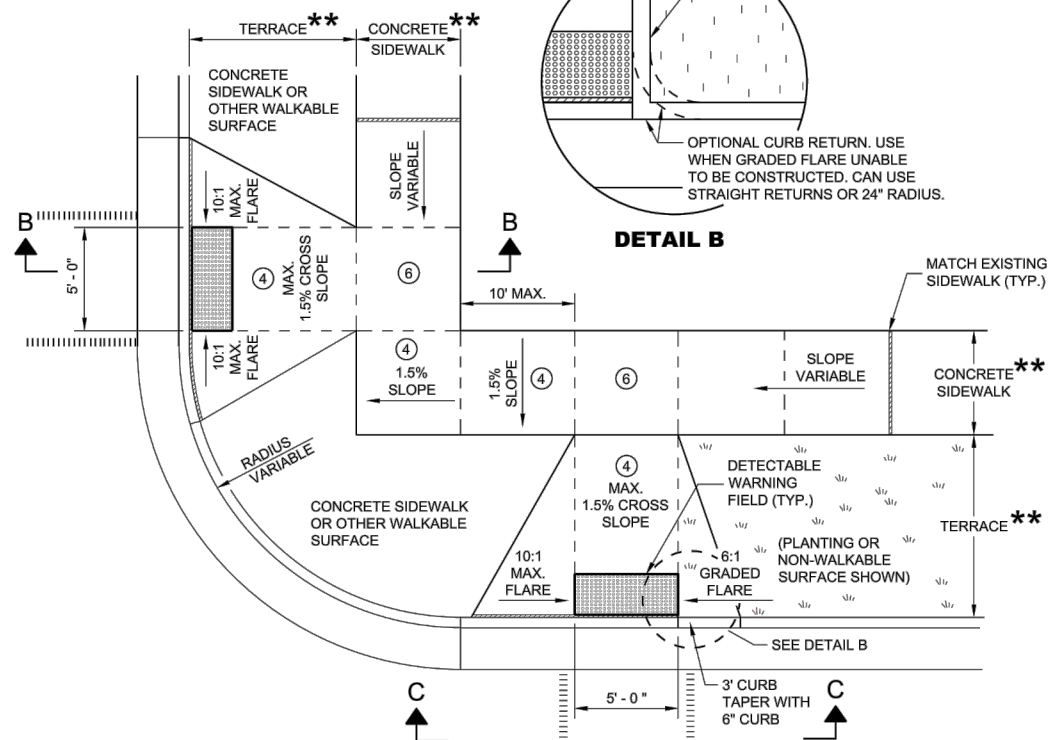
DETAIL A



PLAN VIEW CURB RAMP TYPE 2 (CENTER OF CORNER RADIUS)



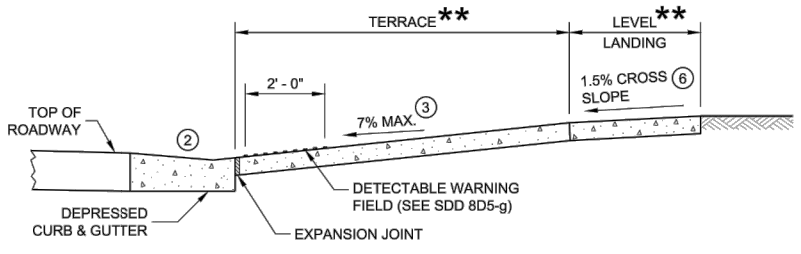
SECTION A - A FOR TYPE 2



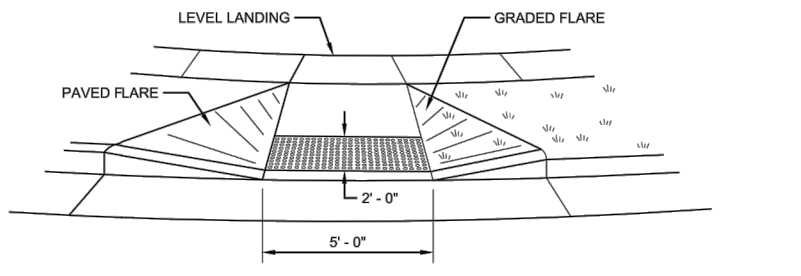
DETAIL B



PLAN VIEW CURB RAMP TYPE 3 (OUTSIDE OF CROSSWALK AREA)



SECTION B - B FOR TYPE 3



VIEW C - C FOR TYPE 3

GENERAL NOTES

- AVOID PLACING DRAINAGE STRUCTURES, JUNCTION BOXES OR OTHER OBSTRUCTIONS IN FRONT OF RAMP ACCESS AREAS.
- DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.
- DETECTABLE WARNING FIELDS THAT ARE INSTALLED AS A GROUP OR SIDE BY SIDE SHALL BE FROM THE SAME MANUFACTURER.
- ② GRADE CHANGE BETWEEN GUTTER FLAG SLOPE AND THE CURB RAMP SLOPE SHALL NOT EXCEED 11%. MAXIMUM GUTTER FLAG SLOPE IS 4%. PROVIDE LONGITUDINAL DRAINAGE AROUND CURB AND AWAY FROM CURB RAMP. NO VERTICAL LIPS OR DISCONTINUITIES GREATER THAN 1/4" INCH ARE ALLOWED. SLOPE OF CURB HEAD OPENING SHALL MATCH THE RAMP SLOPE, MINIMALLY 1.5% AND NOT TO EXCEED 7%. WHEN ADJACENT TO 1.5% LANDING, CONSTRUCT CURB HEAD OPENING AT 1.5% IN THE DIRECTION OF PEDESTRIAN TRAVEL.
- ③ AN 8.33% CURB RAMP SLOPE IS ALLOWABLE WITH FLATTENED GUTTER FLAG SLOPE (2.67% OR LESS) AND NOT TO EXCEED 11% GRADE CHANGE.
- ④ ±0.5% CONSTRUCTION TOLERANCE IN SIDEWALK CROSS SLOPE. THE SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
- ⑥ PROVIDE A LEVEL LANDING (MAXIMUM 2% SLOPE) IN ANY DIRECTION OF PEDESTRIAN TRAVEL. STANDARD LEVEL LANDING SIZE IS 5 FEET X 5 FEET.
- ⑦ WHEN GRADE BREAK DISTANCE EXCEEDS 5 FEET, USE RADIAL DETECTABLE WARNING FIELD PER SDD 8D5-f.
- ⑧ PROVIDE GRADE BREAK PERPENDICULAR TO DIRECTION OF WHEELCHAIR TRAVEL.
- ⑨ WHEN DISTANCE IS LESS THAN 6' - 0", IT MAY BE DIFFICULT TO ACHIEVE A 7% SLOPE OR FLATTER ALONG THE RAMP. REDUCE CURB HEIGHT IN TRIANGLE AREA TO ACHIEVE 7% SLOPE OR FLATTER ON RAMP. CONSTRUCT 2-INCH MINIMUM CURB HEIGHT BETWEEN 10:1 FLARES.

- * MAXIMUM 2.0% SLOPE IN ALL DIRECTIONS IN FRONT OF GRADE BREAK
- ** WIDTH SHOWN ELSEWHERE IN THE PLANS

LEGEND

- 1/2" EXPANSION JOINT SIDEWALK
- CONTRACTION JOINT SIDEWALK
- ||||| PAVEMENT MARKING CROSSWALK (WHITE)

**CURB RAMPS
TYPE 2 AND 3**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

SDD 08D05 - 20b

SDD 08D05 - 20b



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CONSTRUCTION DETAILS SIDEWALK AND CURB AND GUTTER REPAIRS

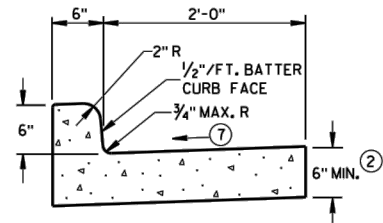
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

	BY	DATE
SURVEYED		
DRAWN	KAD	2-2020
DESIGNED		
CHECKED	EPR	2-2020

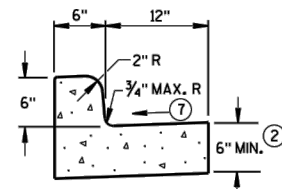
REVISIONS / ISSUES			
NO.	DATE	BY	REMARKS

x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Standard Detail Drawings.dwg

SDD 8d1-a Concrete Curb, Concrete Curb & Gutter

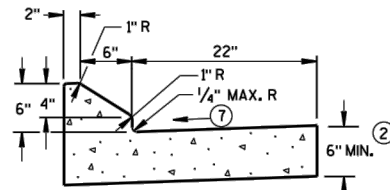


TYPES A^① & D

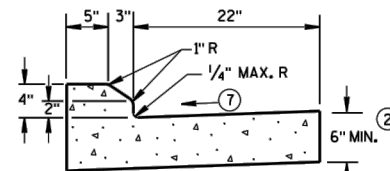


TYPES A^① & D

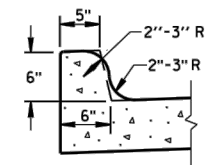
CONCRETE CURB & GUTTER 18"



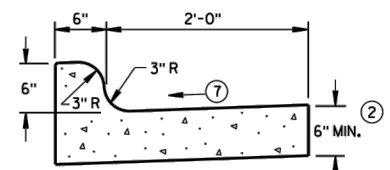
6" SLOPED CURB TYPES G^① & J



4" SLOPED CURB TYPES G^① & J

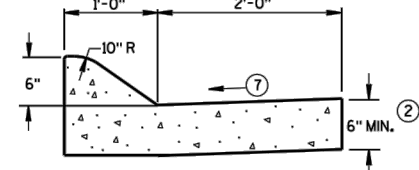


TYPES K^① & L
(OPTIONAL CURB SHAPE)

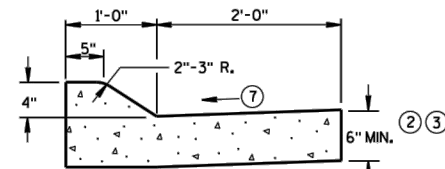


TYPES K^① & L

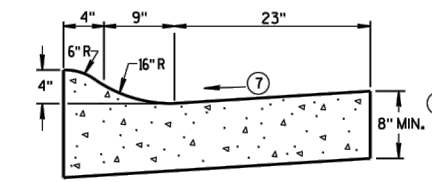
CONCRETE CURB & GUTTER 30"



6" SLOPED CURB TYPES A^① & D

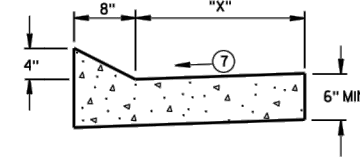


4" SLOPED CURB TYPES A^① & D



4" SLOPED CURB TYPES R^① & T^⑤

CONCRETE CURB & GUTTER 36"



TYPES TBT & TBTT^①

CONCRETE CURB & GUTTER

TBT & TBTT	"X"
30"	22"
36"	28"

GENERAL NOTES

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE CONTRACT.

PAVEMENT TIES AND TIE BARS SHALL BE EPOXY COATED IN CONFORMANCE WITH SUBSECTION 505.2.6.2 OF THE STANDARD SPECIFICATIONS.

INTEGRAL CURB & GUTTER SHALL CONFORM TO THE DETAILS SHOWN FOR CONCRETE CURB & GUTTER INCLUDING THE TRANSVERSE GUTTER SLOPE.

WHERE THE TRANSVERSE JOINTS IN THE PAVEMENT ARE REQUIRED TO BE SEALED, THE JOINTS IN THE INTEGRAL CURB AND GUTTER SHALL BE SEALED TO THE FACE OF CURB WITH THE SAME TYPE OF SEALANT. THE COST OF FURNISHING AND INSTALLING THIS SEALANT SHALL BE INCIDENTAL TO THE ITEM CONCRETE CURB AND GUTTER.

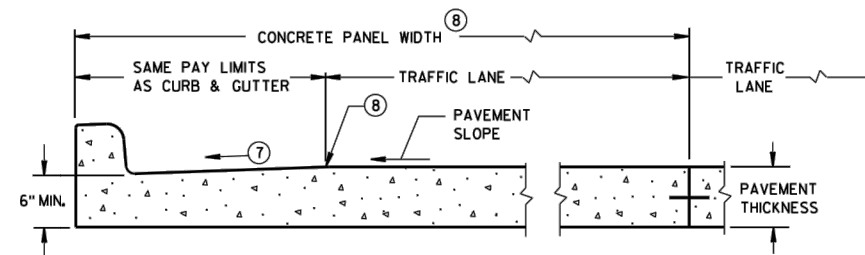
UNLESS OTHERWISE SHOWN ON THE TYPICAL CROSS SECTIONS, THE BASE AGGREGATE AND COMMON EXCAVATION LIMITS ARE 2'-0" BEHIND THE BACK OF CURBS.

- ① TIE BARS ARE REQUIRED FOR CURB AND GUTTER TYPES A, G, K, R AND TBTT.
- ② THE BOTTOM OF CURB AND GUTTER MAY BE CONSTRUCTED EITHER LEVEL OR PARALLEL TO THE SLOPE OF THE SUBGRADE OR BASE AGGREGATE PROVIDED A 6" MINIMUM GUTTER THICKNESS IS MAINTAINED.
- ③ USE 8" MINIMUM GUTTER THICKNESS WHEN USED WITH AN ADJACENT CONCRETE TRUCK APRON PLACED BEHIND BACK OF CURB.
- ④ THE BOTTOM OF CURB AND GUTTER MAY BE CONSTRUCTED EITHER LEVEL OR PARALLEL TO THE SLOPE OF THE SUBGRADE OR BASE AGGREGATE PROVIDED A 8" MINIMUM GUTTER THICKNESS IS MAINTAINED.
- ⑤ THE FACE OF CURB IS 6" FROM THE BACK OF CURB.
- ⑥ WHEN REVERSE SLOPE GUTTER IS REQUIRED, THE LOCATION(S) WILL BE SHOWN ELSEWHERE IN THE PLAN.
- ⑦ USE 4% GUTTER CROSS SLOPE UNLESS OTHERWISE NOTED IN THE PLANS.
- ⑧ INCLUDE LONGITUDINAL JOINT AND TIE BARS ALONG LANE EDGE WHEN CONCRETE PANEL WIDTH EXCEEDS THE MAXIMUM WIDTH PER TABLE BELOW. LONGITUDINAL JOINT(S) ARE NOT ALLOWED WITHIN TRAFFIC LANES AND BIKE LANES. LONGITUDINAL JOINT MAY BE SAWED.

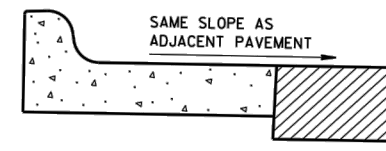
PAVEMENT THICKNESS AND MAXIMUM CONCRETE PANEL WIDTH TABLE

PAVEMENT THICKNESS	MAXIMUM PANEL WIDTH
LESS THAN 10"	12'
10" & ABOVE	15'

* BIKE LANE IS NOT SHOWN.



PARTIAL SECTION OF PAVEMENT WITH INTEGRAL CURB & GUTTER



REVERSE SLOPE GUTTER^⑥
(TYPICAL FOR ALL CURB & GUTTER TYPES)

CONCRETE CURB & GUTTER

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

6

S.D.D. 8 D 1-20a

6

S.D.D. 8 D 1-20a



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CONSTRUCTION DETAILS SIDEWALK AND CURB AND GUTTER REPAIRS

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

BY	DATE
SURVEYED	
DRAWN	KAD 2-2020
DESIGNED	
CHECKED	EPR 2-2020

REVISIONS / ISSUES			
NO.	DATE	BY	REMARKS

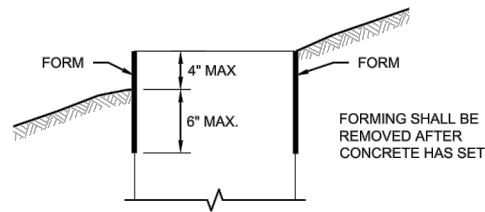
PAGE NO.

C506



SDD 9C2 Concrete Bases, Types 1, 2, 5 & 6

FORM DEPTH SHALL BE NO MORE THAN 6" BELOW GRADE ON THE LOWER SIDE OF BASE



FORMING DETAIL

QUANTITY REQUIREMENTS	CONCRETE BASE TYPE		
	1	2	5 & 6
APPROX. CUBIC YARDS OF CONCRETE	0.40	0.57	0.40
LBS. OF HOOP BAR STEEL	NONE	23	16
LBS. OF VERTICAL BAR STEEL	NONE	60	18

DETAILS OF CONSTRUCTION, MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE CONTRACT.

BASES SHALL BE EXCAVATED BY USE OF A CIRCULAR AUGER.

TOP SURFACES OF CONCRETE BASES SHALL BE TROWEL FINISHED SMOOTH AND LEVEL.

CONDUIT SIZES AND LOCATIONS SHALL BE SHOWN ON THE PLANS

THE FINAL OR TERMINATING CONCRETE BASE IN A CONDUIT RUN SHALL HAVE A 6" EXIT STUB INSTALLED FOR FUTURE CABLING USE. THE EXIT STUB SHALL BE SIZED AS USED THROUGHOUT THE CONDUIT RUN AS SHOWN AT THE ENTRANCE OF THE BASE.

ENDS OF CONDUIT INSTALLED BELOW GRADE FOR FUTURE USE SHALL BE CAPPED IF METALLIC OR PLUGGED IF NON-METALLIC.

MINIMUM BENDING RADIUS OF CONDUIT IS EQUAL TO 6X THE DIAMETER.

CONDUIT HEIGHT ABOVE CONCRETE BASES SHALL BE 1 INCH. ALL METALLIC CONDUIT ENDS SHALL BE REAMED AND THREADED.

ALL CONDUIT ENDS AT THE TOP OF CONCRETE BASES SHALL BE CAPPED IF METALLIC OR PLUGGED IF NON-METALLIC IMMEDIATELY AFTER PLACEMENT AND BEFORE CONCRETE IS POURED. CONDUITS IN WHICH WIRE OR CABLE IS NOT INSTALLED SHALL REMAIN CAPPED OR PLUGGED.

GENERAL NOTES

BELL BENDS SHALL BE INSTALLED ON ALL PVC CONDUIT EXPOSED AT THE TOP OF CONCRETE BASES BEFORE INSTALLATION.

WHEN REQUIRED TO CONNECT NON-METALLIC CONDUIT TO METALLIC CONDUIT, ONLY ADAPTER FITTINGS, U.L. LISTED FOR ELECTRICAL USE, SHALL BE USED.

IF A BASE REQUIRES A DEEP FORM BECAUSE OF LOOSE DIRT OR FILL, THE FORM SHALL BE REMOVED BEFORE BACKFILLING AROUND THE BASE. BACKFILL SHALL BE TAMPED TIGHT AGAINST THE BARE CONCRETE BASE IN LAYERS OF 1 FOOT OR LESS.

A NO. 4 AWG STRANDED COPPER EQUIPMENT GROUNDING CONDUCTOR SHALL BE EXOTHERMICALLY WELDED TO THE EQUIPMENT GROUNDING ELECTRODE (GROUND ROD) FOR TYPE 2, TYPE 5 AND TYPE 6 BASES.

THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE FURNISHED AND INSTALLED TO ENTER ALL BASE TYPES THROUGH A 1 INCH CONDUIT INSTALLED FOR GROUNDING PURPOSES, LEAVING A 4 FOOT COIL OF WIRE ABOVE THE CONCRETE BASE. THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE NEATLY COILED AND THE COILS TIED TOGETHER.

ANCHOR RODS SHALL BE THREADED 12" IN LENGTH ON EACH END OF THE ROD. ANCHOR RODS SHALL BE MANUFACTURED IN ACCORDANCE WITH SECTION 654.2.1 OF THE STANDARD SPECIFICATIONS.

WASHERS AND LOCK WASHERS ARE REQUIRED ON ALL ANCHOR RODS.

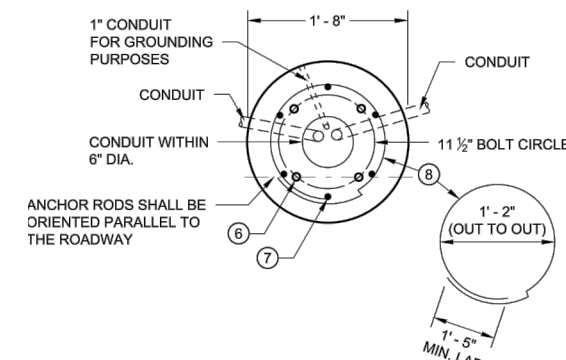
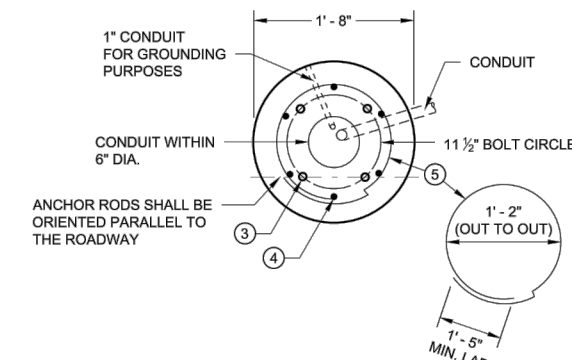
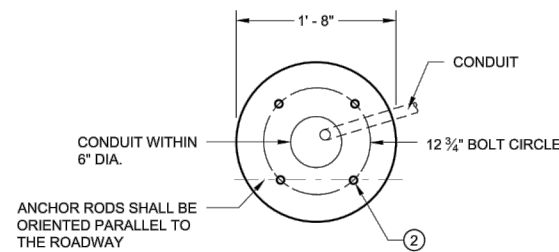
WHEN ANCHOR RODS USING THE ALTERNATE "L" BEND ARE FURNISHED, THE 4 INCH "L" BEND SHALL BE IN ADDITION TO THE SPECIFIED ANCHOR ROD BAR LENGTH. THE "L" BEND SHALL NOT BE THREADED.

ANCHOR RODS SHALL BE INSTALLED WITH MISALIGNMENTS OF LESS THAN 1:40 FROM VERTICAL.

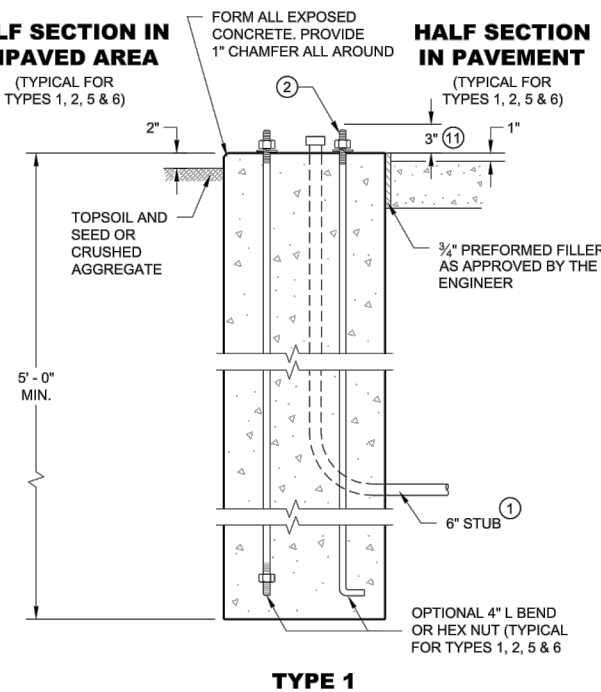
WELDING OF THE ANCHOR RODS TO THE CAGE IS UNACCEPTABLE. TIE WIRES SHALL BE USED.

BAR STEEL REINFORCEMENT SHALL BE COATED WITH POWDERED EPOXY RESIN IN ACCORDANCE WITH SECTION 505 OF THE STANDARD SPECIFICATIONS (LATEST EDITION).

- ① THE MINIMUM DEPTH OF CONDUIT EXITING THE CONCRETE BASE AND INSTALLED BELOW THE TRAVELED WAY SHALL BE 24 INCHES. THE MINIMUM DEPTH OF CONDUIT EXITING THE CONCRETE BASE THAT IS NOT INSTALLED BELOW THE TRAVELED WAY SHALL BE 18 INCHES. THE MAXIMUM DEPTH OF ALL CONDUIT SHALL BE 36 INCHES EXCEPT WITH WRITTEN APPROVAL OF THE ENGINEER.
- ② (4) 1" DIA. X 3'-6" ANCHOR RODS.
- ③ (4) 1" DIA. X 5'-0" ANCHOR RODS.
- ④ (6) NO. 6 X 6'-8" BAR STEEL REINFORCEMENT.
- ⑤ (7) NO. 4 X 5'-1" BAR STEEL REINFORCEMENT @ 1'-0" C-C.
- ⑥ (4) 1" DIA. X 3'-6" ANCHOR RODS.
- ⑦ (6) NO. 4 X 4'-8" BAR STEEL REINFORCEMENT.
- ⑧ (5) NO. 4 X 5'-1" BAR STEEL REINFORCEMENT @ 1'-0" C-C.
- ⑨ EXOTHERMIC CONNECTION TO EQUIPMENT GROUNDING CONDUCTOR
- ⑩ 5/8" DIA. X 8'-0" COPPERCLAD EQUIPMENT GROUNDING ELECTRODE REQUIRED
- ⑪ ANY ANCHOR ROD PROJECTION SHORTER THAN 2 3/4" OR LONGER THAN 3 1/2" SHALL REQUIRE THE BASE TO BE REMOVED AND REPLACED AT THE CONTRACTORS EXPENSE.
- ⑫ FOR NON - BREAKAWAY INSTALLATIONS, 4 1/2" ± ANCHOR ROD PROJECTION WITH THE USE OF LEVELING NUTS. RODENT SCREEN REQUIRED.

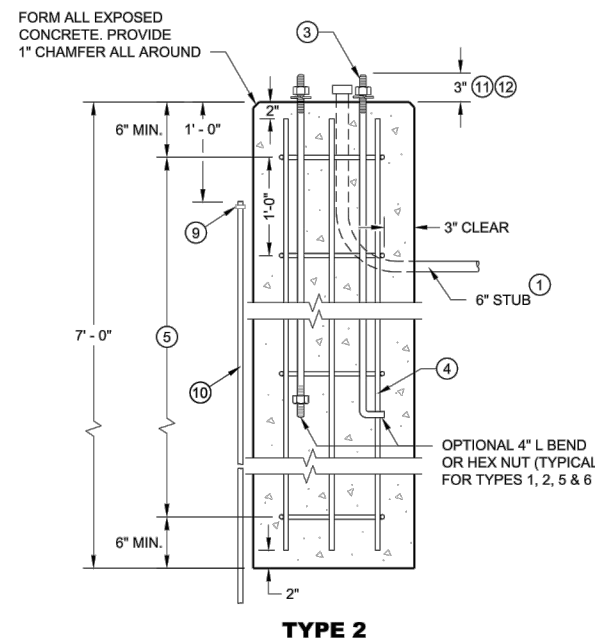


HALF SECTION IN UNPAVED AREA (TYPICAL FOR TYPES 1, 2, 5 & 6)

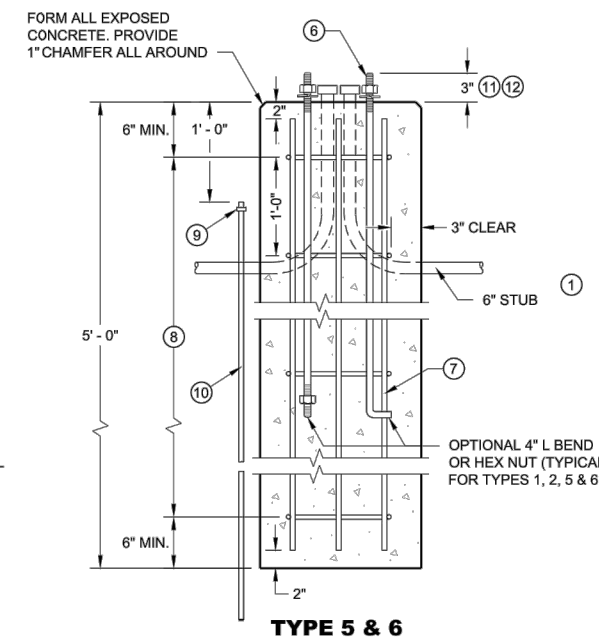


TYPE 1

HALF SECTION IN PAVEMENT (TYPICAL FOR TYPES 1, 2, 5 & 6)



TYPE 2
CONCRETE BASES



TYPE 5 & 6

CONCRETE BASES TYPES 1, 2, 5, & 6

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
May 2019 /S/ Ahmet Demirbilek
DATE STATE ELECTRICAL ENGINEER

FHWA

SDD 09C02 - 09



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CONSTRUCTION DETAILS LIGHT POLE BASE

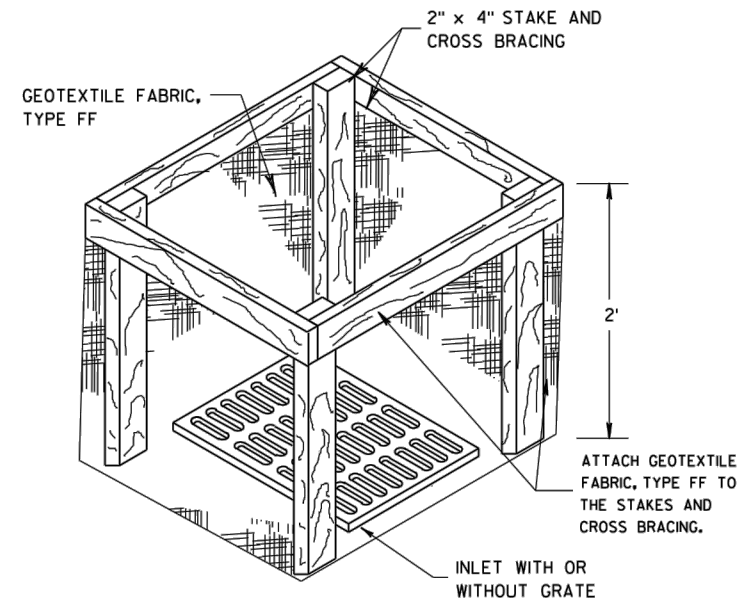
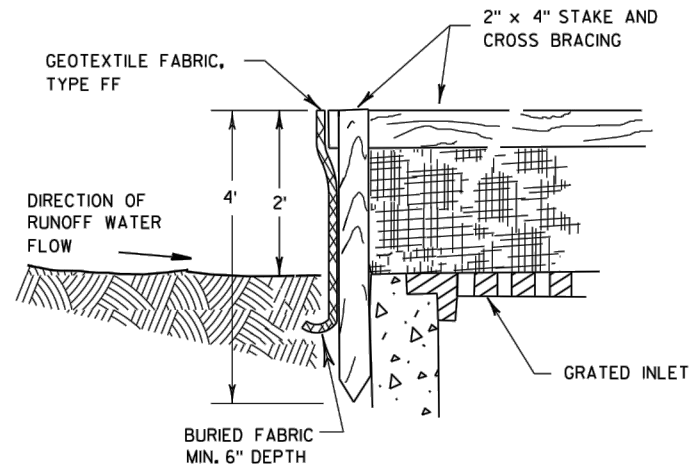
NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02

	BY	DATE	REVISIONS / ISSUES	
			NO.	DATE
SURVEYED				
DRAWN	KAD	2-2020		
DESIGNED				
CHECKED	EPR	2-2020		

PAGE NO.

C507

SDD 8e10 Inlet Protection Type A, B, C and D



INLET PROTECTION, TYPE A

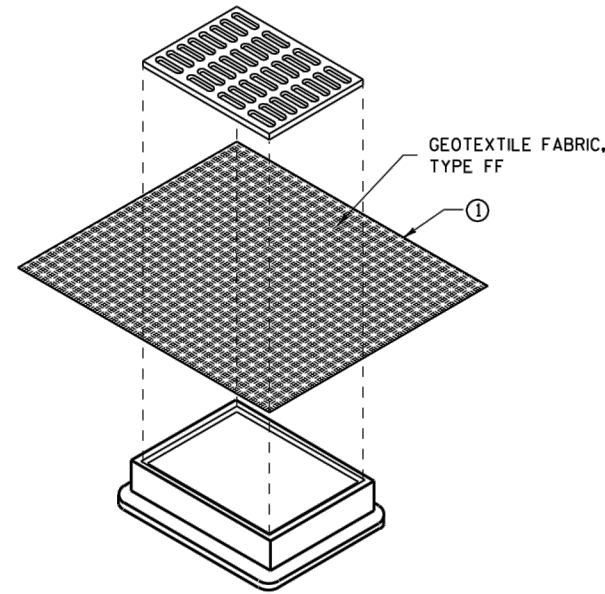
GENERAL NOTES

INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

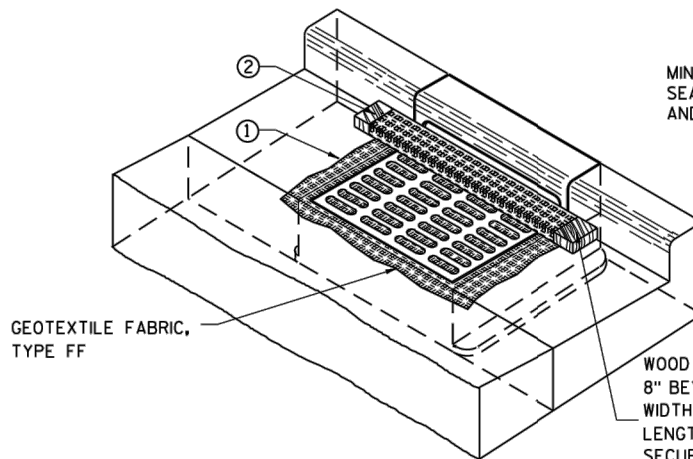
WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

- ① FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ② FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.
- ③ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2X4.



INLET PROTECTION, TYPE B (WITHOUT CURB BOX)

(CAN BE INSTALLED IN ANY INLET WITHOUT A CURB BOX)



INLET PROTECTION, TYPE C (WITH CURB BOX)

INSTALLATION NOTES

TYPE B & C

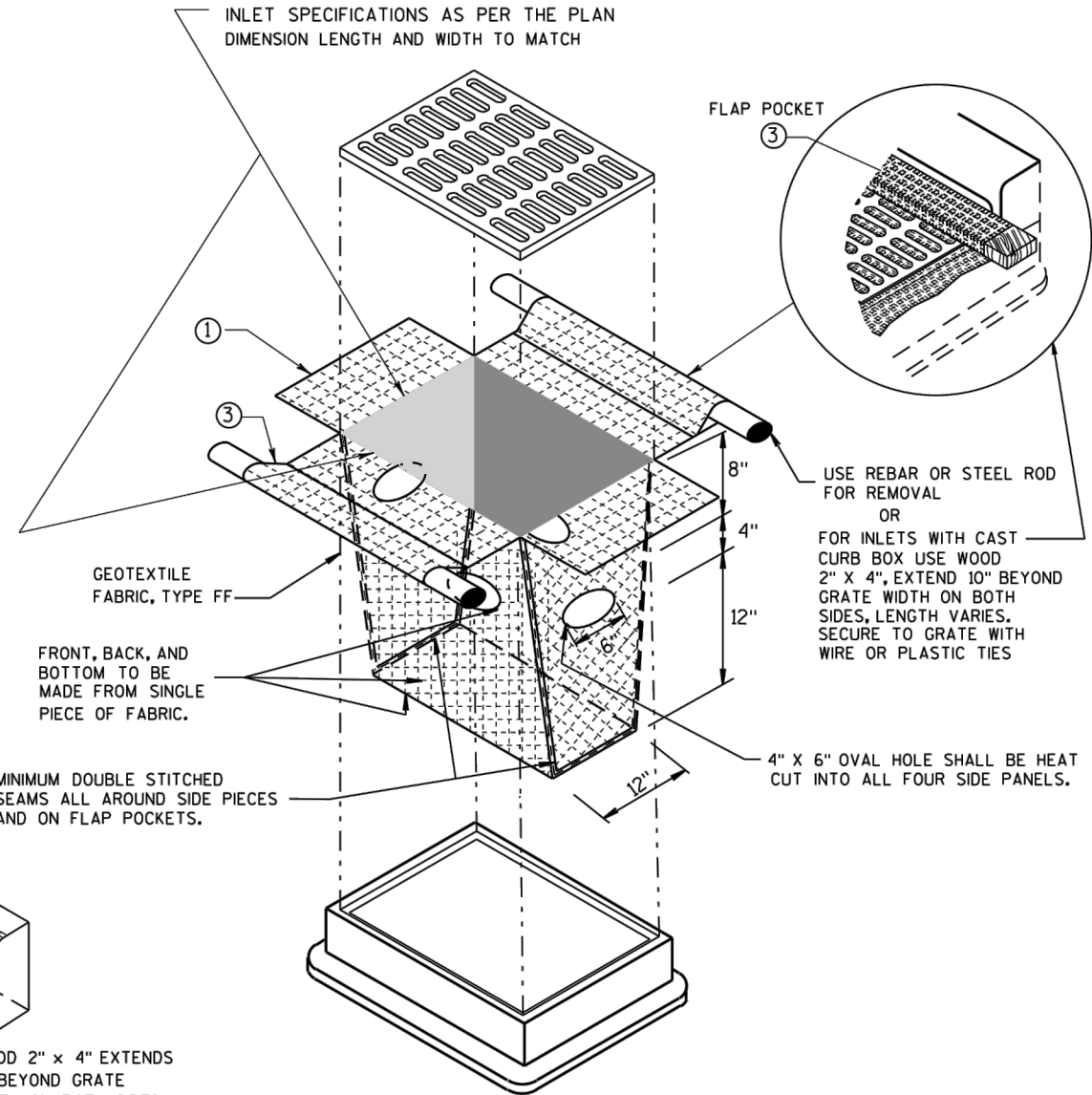
TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE. THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.

TYPE D

DO NOT INSTALL INLET PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CINCHE THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.



INLET PROTECTION, TYPE D

(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX AS PER NOTE ②)

INLET PROTECTION TYPE A, B, C, AND D

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
10-16-02 /s/ Beth Cannestra
DATE CHIEF ROADWAY DEVELOPMENT ENGINEER
FHWA

6

6

S.D.D. 8 E 10-2

S.D.D. 8 E 10-2



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

**CONSTRUCTION DETAILS
INLET PROTECTION**

NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02	SURVEYED	BY	DATE	REVISIONS / ISSUES		PAGE NO. C508
	DRAWN	KAD	2-2020	NO.	DATE	
	DESIGNED			BY	REMARKS	
	CHECKED	EPR	2-2020			

x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Standard Detail Drawings.dwg

SDD 13c9-a Concrete Pavement Repair and Replacement

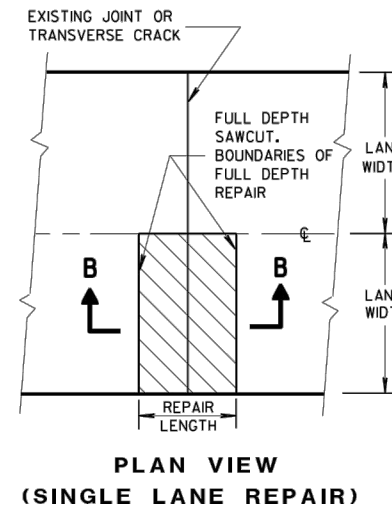
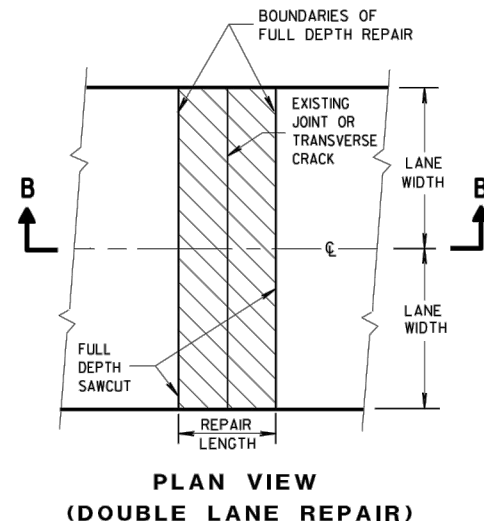
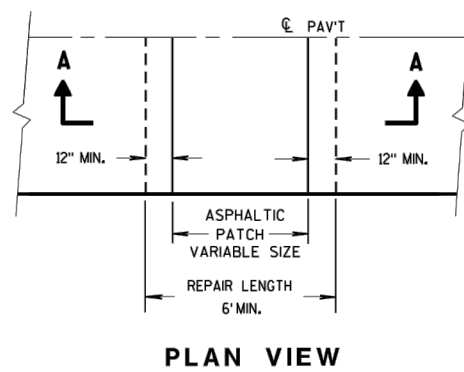
GENERAL NOTES

SAW CUT, DRILL, AND LIFT OUT EXISTING CONCRETE PAVEMENT WITHIN THE BOUNDARIES OF CONCRETE REPAIR AREAS. THE CONTRACTOR MAY MAKE ADDITIONAL SAW CUTS INSIDE THE REPAIR LIMITS TO REDUCE WEIGHT AND SIZE OF CONCRETE PIECES.

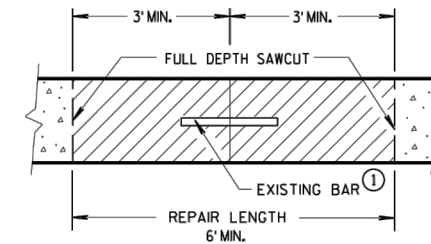
PROVIDE A 6-FOOT MINIMUM DISTANCE FROM BOUNDARIES OF CONCRETE REPAIR AREAS TO ADJACENT TRANSVERSE JOINT OR CRACK IN THE SAME LANE.

THE LENGTH OF THE REPAIRS MAY VARY FROM THE DIMENSIONS SHOWN IF THE EXISTING CONCRETE PAVEMENT IS NONDOWELED AND THE PAVEMENT IS TO BE OVERLAID AFTER REPAIRING.

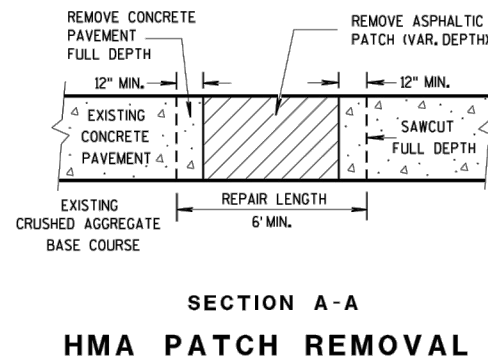
① DOWEL BARS MIGHT NOT EXIST.



FULL DEPTH CONCRETE PAVEMENT REMOVAL



CONCRETE REMOVAL



6

6

S.D.D. 13 C 9-15a

S.D.D. 13 C 9-15a

CONCRETE PAVEMENT REPAIR AND REPLACEMENT

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CONSTRUCTION DETAILS
PAVEMENT REPAIR

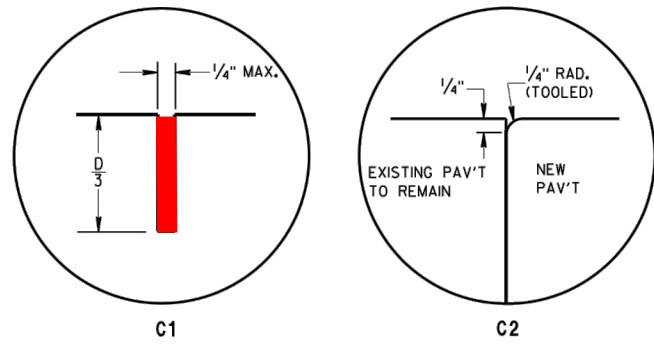
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

	BY	DATE
SURVEYED	KAD	2-2020
DRAWN		
DESIGNED		
CHECKED	EPR	2-2020

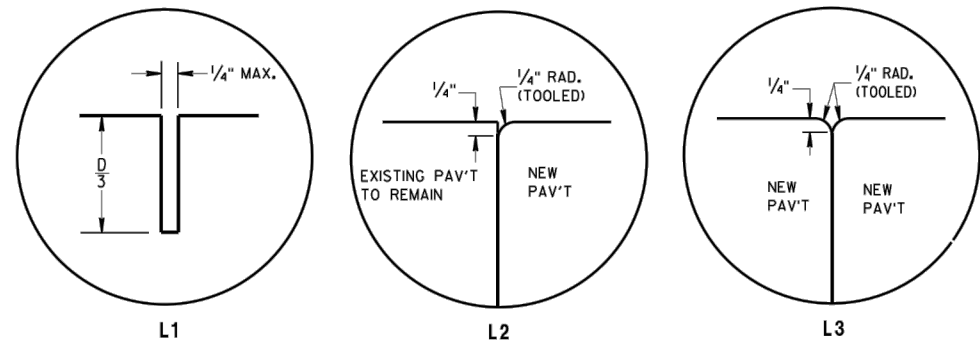
REVISIONS / ISSUES			
NO.	DATE	BY	REMARKS

x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Standard Detail Drawings.dwg

SDD 13c9-b Concrete Pavement Repair and Replacement



TRANSVERSE JOINTS

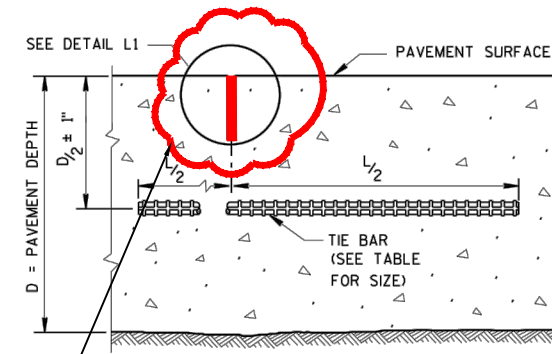


LONGITUDINAL JOINTS

PAVEMENT DEPTH (D)	TIE BAR SIZE	TIE BAR LENGTH (L)	MAX. TIE BAR SPACING
< 10 1/2"	NO. 4	30"	36"
≥ 10 1/2"	NO. 5	36"	36"
	NO. 4*	30"	24" **

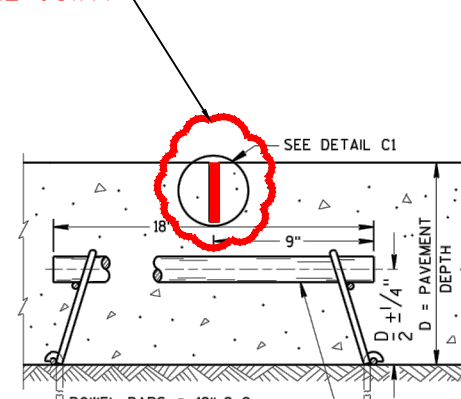
* SUBSTITUTE BENT BARS AT LONGITUDINAL JOINTS WHEN EQUIPMENT LIMITATIONS DURING CONSTRUCTION WARRANT (e.g. AUXILIARY LANES OR TURN LANES)

** CONFORM TO 15" MINIMUM SPACING FROM TRANSVERSE JOINTS; SPACING BETWEEN TIE BARS WILL BE 30" AT TRANSVERSE JOINTS.



SECTION C-C
SAWED LONGITUDINAL JOINT

SEAL JOINT



SECTION F-F
CONTRACTION JOINT

GENERAL NOTES

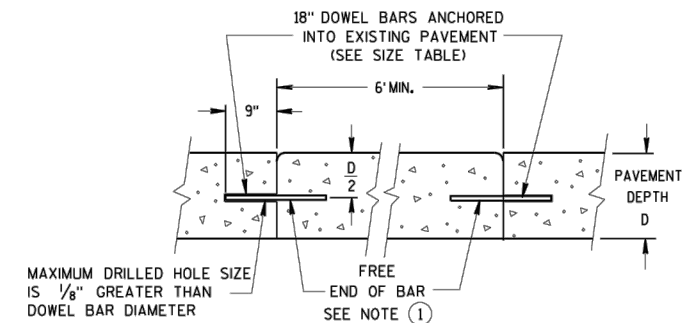
INSTALL DOWEL BARS PARALLEL TO THE PAVEMENT CENTERLINE AND PAVEMENT SURFACE.

CONCRETE PAVEMENT REPAIRS OF EXISTING NONDOWELED CONCRETE PAVEMENTS DO NOT NEED TO BE DOWELED.

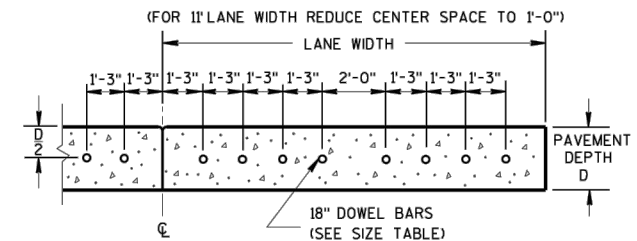
ANCHOR DOWEL BARS AND TIE BARS INTO DRILLED HOLES WITH AN EPOXY.

FOR MULTI-LANE CONCRETE PAVEMENT REPLACEMENTS, PROVIDE A MINIMUM DISTANCE OF 15 INCHES FROM ALL TRANSVERSE JOINTS OR EDGES OF REPLACEMENT TO THE CENTER OF THE TIE BAR NEAREST THAT JOINT OR EDGE.

① APPLY A THIN UNIFORM COATING OF SURFACE TREATMENT TO THE FREE END OF DOWEL BARS TO PREVENT BONDING.



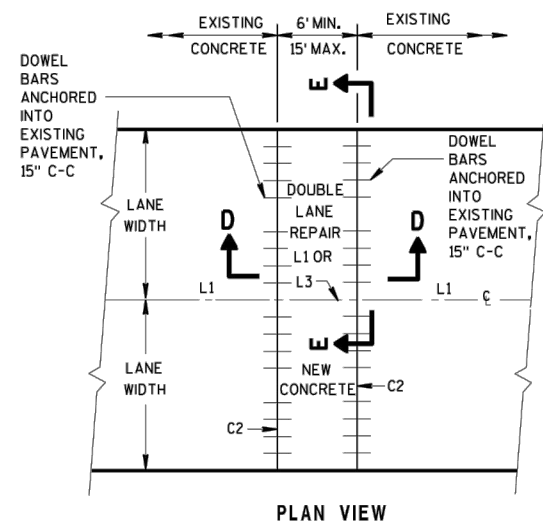
SECTION D-D



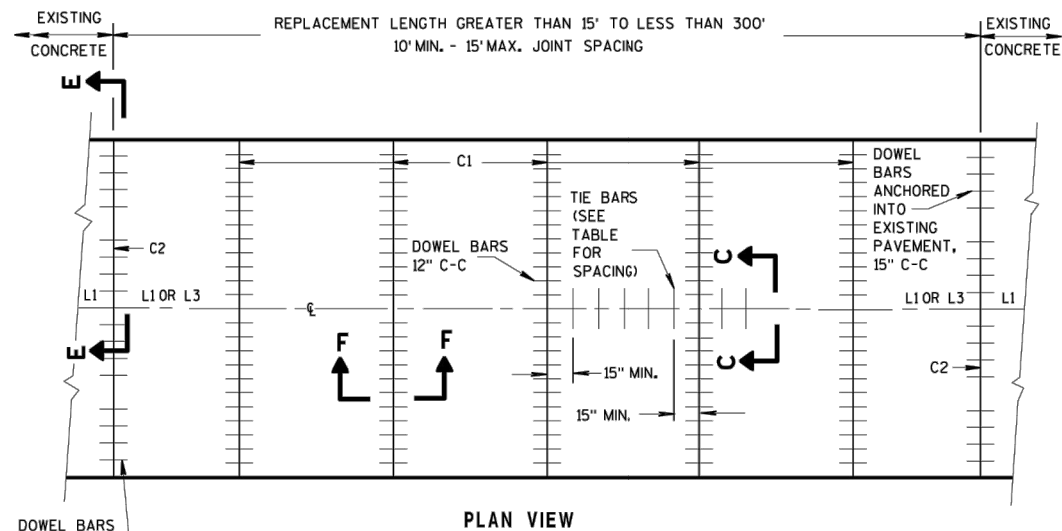
SECTION E-E
DRILLED DOWEL BAR CONSTRUCTION JOINT

PAVEMENT DEPTH, DOWEL BAR SIZE AND JOINT SPACING TABLE

PAVEMENT DEPTH (D)	DOWEL BAR DIAMETER	DRILLED DOWEL BAR DIAMETER	CONTRACTION JOINT SPACING
5 1/2", 6", 6 1/2"	NONE	NONE	12'
7", 7 1/2"	1"	1"	14'
8", 8 1/2"	1 1/4"	1 1/4"	15'
9", 9 1/2"	1 1/4"	1 1/4"	15'
10" & ABOVE	1 1/2"	1 1/4"	15'



PLAN VIEW
MULTI-LANE CONCRETE PAVEMENT REPAIR



PLAN VIEW
MULTI-LANE CONCRETE PAVEMENT REPLACEMENT

6

6

S.D.D. 13 C 9-15b

S.D.D. 13 C 9-15b



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

CONSTRUCTION DETAILS
PAVEMENT REPAIR

NAME: STREET RECONSTRUCTION AND UTILITY RELAY
PROJECT # 20-02

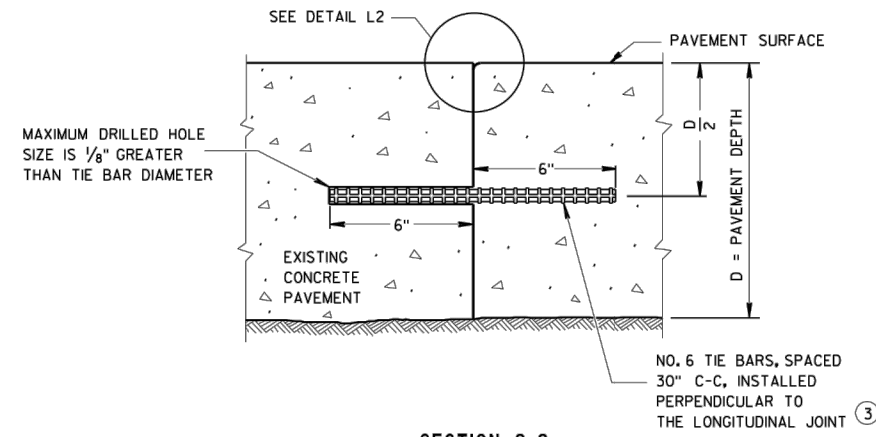
BY	DATE	REVISIONS / ISSUES	
		NO.	DATE
SURVEYED			
DRAWN	KAD	2-2020	
DESIGNED			
CHECKED	EPR	2-2020	

PAGE NO. C510

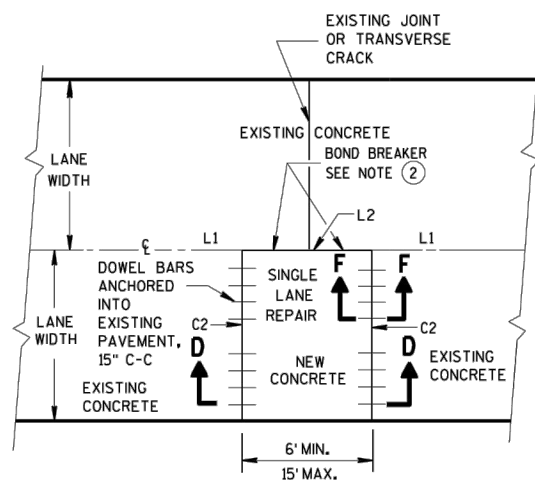
x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\200-CAD\Standard Detail Drawings.dwg

GENERAL NOTES

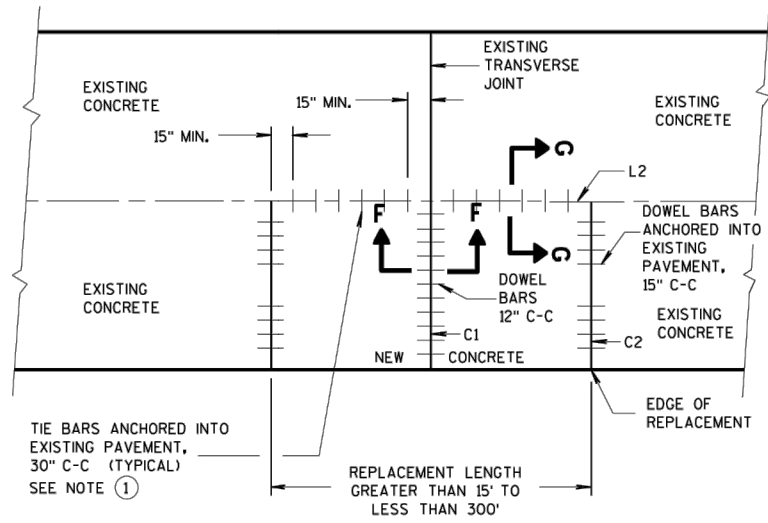
- ① WITH THE APPROVAL OF THE ENGINEER, FOR SINGLE LANE PAVEMENT REPLACEMENTS LESS THAN 30 FEET IN LENGTH, THE CONTRACTOR MAY INSTALL DRILLED TIE BARS ON 6:1 SKEW HORIZONTALLY, DIRECTION OF SKEW ALTERNATING WITH EACH SUCCESSIVE BAR. DRIVE SKEWED TIE BARS TO A DEPTH OF 6 INCHES IN A HOLE OF SUCH A DIAMETER AS TO PROVIDE A TIGHT DRIVEN FIT.
- ② USE AN ENGINEER-APPROVED BOND BREAKER (E.G. RELEASE AGENT, CURING COMPOUND) FOR SINGLE LANE REPAIRS UP TO 15 FEET IN LENGTH.
- ③ ANCHOR TIE BARS INTO DRILLED HOLES WITH AN EPOXY.



**SECTION G-G
TIE BARS ANCHORED
INTO EXISTING PAVEMENT**



**PLAN VIEW
SINGLE LANE
CONCRETE PAVEMENT REPAIR**



**PLAN VIEW
SINGLE LANE
CONCRETE PAVEMENT REPLACEMENT**

CONCRETE PAVEMENT REPAIR AND REPLACEMENT	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED March 2018 DATE	/s/ Peter Kemp, P.E. PAVEMENT SUPERVISOR
FHWA	

6

6

S.D.D. 13 C 9-15c

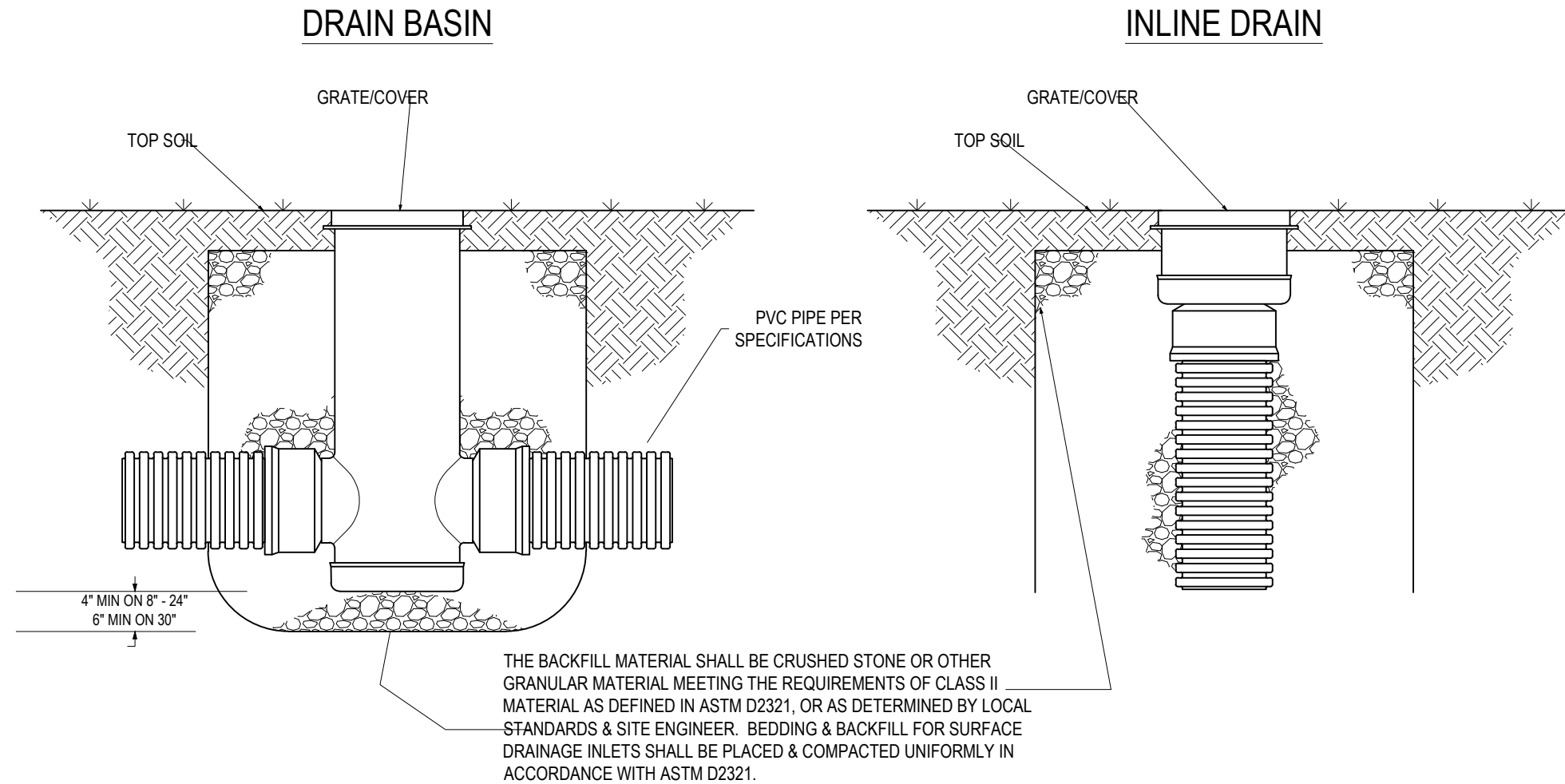
S.D.D. 13 C 9-15c



NAME: STREET RECONSTRUCTION AND UTILITY RELAY PROJECT # 20-02	BY	DATE	REVISIONS / ISSUES		PAGE NO. C511	
	SURVEYED		NO.	DATE		REMARKS
	DRAWN	KAD	2-2020			
	DESIGNED					
	CHECKED	EPR	2-2020			

x:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Standard Detail Drawings.dwg

NON TRAFFIC INSTALLATION



THIS PRINT DISCLOSES SUBJECT MATTER IN WHICH NYLOPLAST HAS PROPRIETARY RIGHTS. THE RECEIPT OR POSSESSION OF THIS PRINT DOES NOT CONFER, TRANSFER, OR LICENSE THE USE OF THE DESIGN OR TECHNICAL INFORMATION SHOWN HEREIN REPRODUCTION OF THIS PRINT OR ANY INFORMATION CONTAINED HEREIN, OR MANUFACTURE OF ANY ARTICLE HEREFROM, FOR THE DISCLOSURE TO OTHERS IS FORBIDDEN, EXCEPT BY SPECIFIC WRITTEN PERMISSION FROM NYLOPLAST. ©2010 NYLOPLAST	DRAWN BY	CJA	MATERIAL		3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
	DATE	9-30-99	PROJECT NO./NAME		
	REVISED BY	EBC	DATE		TITLE
	DATE	2-24-10	DWG SIZE		A
	SCALE	1:25	SHEET	1 OF 1	DWG NO. 7001-110-111 REV D



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

CONSTRUCTION DETAILS NYLOPLAST YARD DRAIN

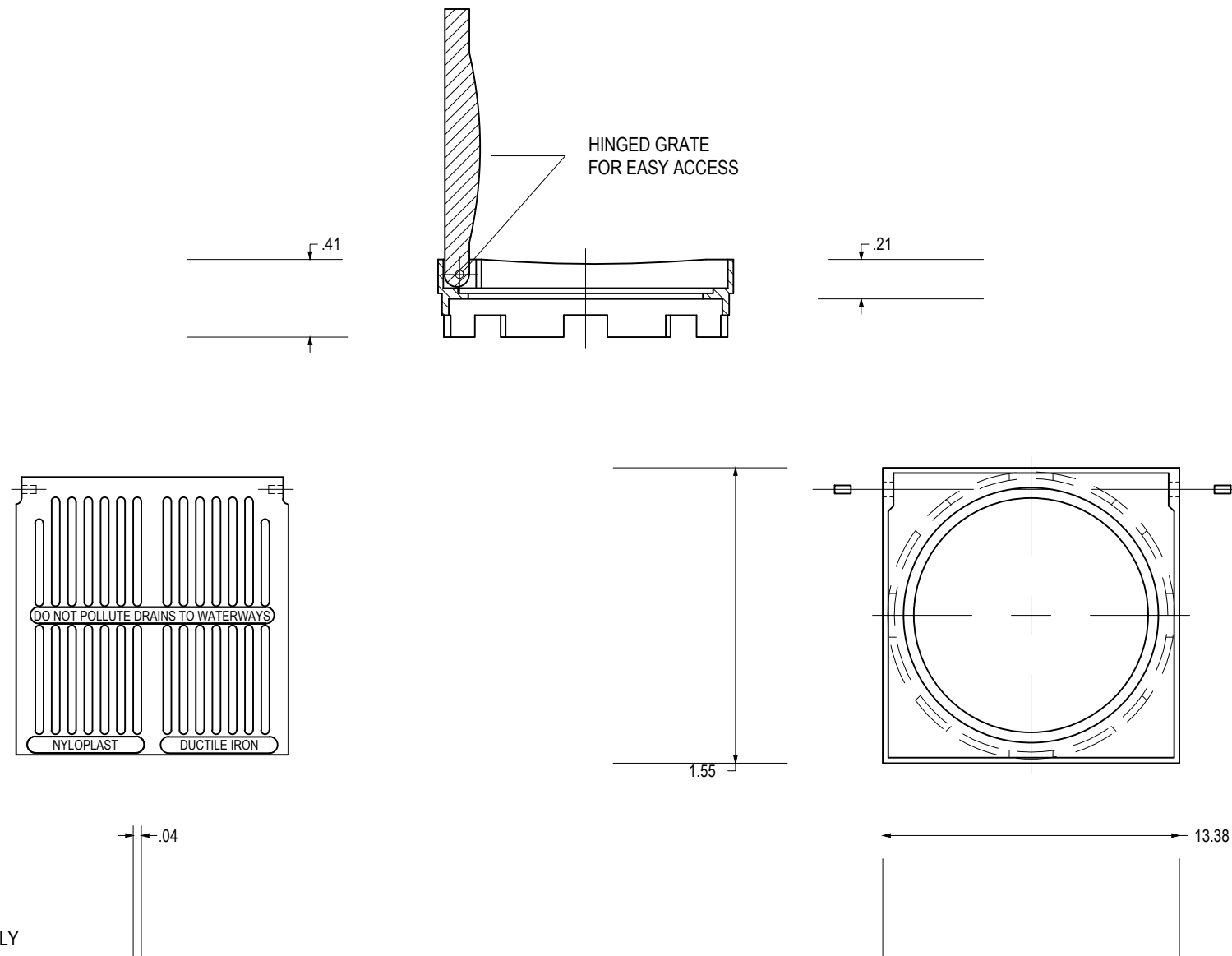
NAME: STREET RECONSTRUCTION AND UTILITY RELAY
 PROJECT # 20-02

	BY	DATE	REVISIONS / ISSUES		REMARKS
			NO.	DATE	
SURVEYED					
DRAWN	KAD	2-2020			
DESIGNED					
CHECKED	EPR	2-2020			

X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Standard Detail Drawings.dwg

1299CGP

APPROX. DRAIN AREA = 50.60 SQ IN
 APPROX. WEIGHT WITH FRAME = 35.04 LBS



DIMENSIONS ARE FOR REFERENCE ONLY
 ACTUAL DIMENSIONS MAY VARY
 DIMENSIONS ARE IN INCHES

GRATE MEETS H-10 LOAD RATING
 QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
 PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
 SIZE OF OPENING MEETS REQUIREMENTS OF AMERICAN DISABILITY
 ACT AS STATED IN FEDERAL REGISTER PART III, DEPARTMENT OF
 JUSTICE, 28 CFR PART 36.
 LOCKING DEVICE AVAILABLE UPON REQUEST SEE DRAWING NO.
 7001-110-034

THIS PRINT DISCLOSES SUBJECT MATTER IN WHICH NYLOPLAST HAS PROPRIETARY RIGHTS. THE RECEIPT OR POSSESSION OF THIS PRINT DOES NOT CONFER, TRANSFER, OR LICENSE THE USE OF THE DESIGN OR TECHNICAL INFORMATION SHOWN HEREIN REPRODUCTION OF THIS PRINT OR ANY INFORMATION CONTAINED HEREIN, OR MANUFACTURE OF ANY ARTICLE HEREFROM, FOR THE DISCLOSURE TO OTHERS IS FORBIDDEN, EXCEPT BY SPECIFIC WRITTEN PERMISSION FROM NYLOPLAST. ©2010 NYLOPLAST

DRAWN BY	EBC	MATERIAL	
DATE	3-3-06	DUCTILE IRON	
REVISED BY	EBC	PROJECT NO./NAME	
DATE	3-13-10		
DWG SIZE	A	SCALE	1:8 SHEET 1 OF 1

	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com	
	TITLE 12 IN PEDESTRIAN GRATE ASSEMBLY	
DWG NO.	7001-110-202	REV C



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
 OFFICE 920-339-4061 FAX 920-339-4071

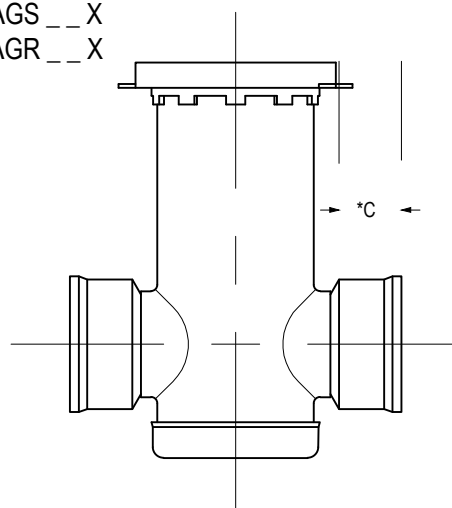
CONSTRUCTION DETAILS NYLOPLAST YARD DRAIN

NAME:
 STREET RECONSTRUCTION AND
 UTILITY RELAY
 PROJECT # 20-02

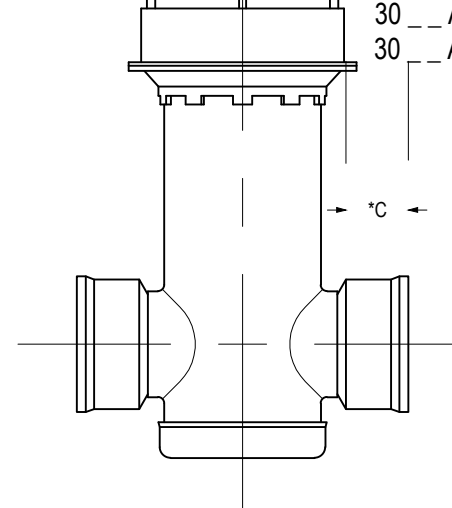
	BY	DATE	REVISIONS / ISSUES	
			NO.	DATE BY
SURVEYED				
DRAWN	KAD	2-2020		
DESIGNED				
CHECKED	EPR	2-2020		

BODY SIZE	ADAPTER SIZE	A	B
8"	4"	6.20	7.50
8"	6"	6.20	5.25
8"	8"	6.70	7.25
10"	4"	7.25	8.75
10"	6"	7.25	8.75
10"	8"	7.75	6.50
10"	10"	7.75	7.75
12"	4"	8.25	10.50
12"	6"	8.25	11.50
12"	8"	8.75	11.50
12"	10"	8.75	11.25
12"	12"	9.25	6.00
15"	4"	9.65	13.25
15"	6"	9.65	12.75
15"	8"	10.15	12.25
15"	10"	10.15	13.50
15"	12"	10.65	12.75
15"	15"	10.65	7.00
18"	4"	11.35	14.00
18"	6"	11.35	14.00
18"	8"	11.85	14.00
18"	10"	11.85	14.00
18"	12"	12.35	14.00
18"	15"	12.35	13.50
18"	18"	12.85	8.25
24"	4"	14.40	15.00
24"	6"	14.40	15.00
24"	8"	14.90	15.00
24"	10"	14.90	15.00
24"	12"	15.40	15.00
24"	15"	15.40	15.00
24"	18"	15.90	10.00
24"	24"	16.90	10.25
30"	4"	18.00	15.25
30"	6"	18.00	15.50
30"	8"	18.50	15.75
30"	10"	18.50	16.00
30"	12"	19.00	16.50
30"	15"	19.00	17.00
30"	18"	19.50	17.75
30"	24"	20.50	14.00
30"	30"	27.00	9.50

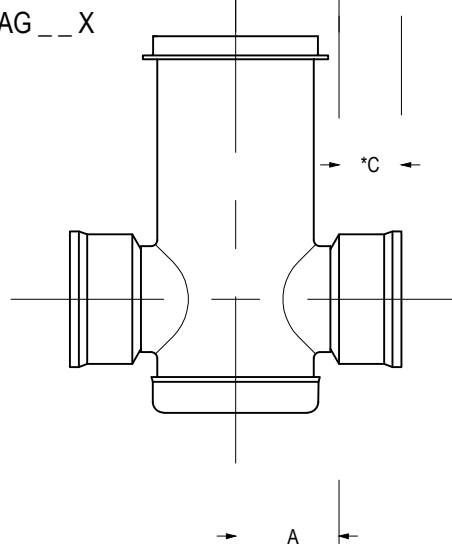
32 __ AGS __ X
32 __ AGR __ X



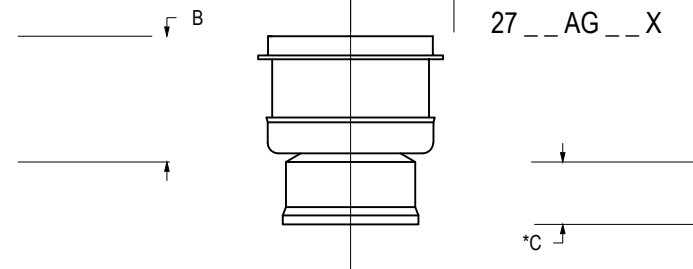
30 __ AGS __ X
30 __ AGR __ X



28 __ AG __ X



27 __ AG __ X



DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
*C - SEE DRAWING NO. 7001-110-275 FOR ADS N-12 &
HANCOR DUAL WALL BELL INFORMATION &
DRAWING NO. 7001-110-364 FOR N-12 HP BELL
INFORMATION

THIS PRINT DISCLOSES SUBJECT MATTER IN WHICH NYLOPLAST HAS PROPRIETARY RIGHTS. THE RECEIPT OR POSSESSION OF THIS PRINT DOES NOT CONFER, TRANSFER, OR LICENSE THE USE OF THE DESIGN OR TECHNICAL INFORMATION SHOWN HEREIN. REPRODUCTION OF THIS PRINT OR ANY INFORMATION CONTAINED HEREIN, OR MANUFACTURE OF ANY ARTICLE HEREFROM, FOR THE DISCLOSURE TO OTHERS IS FORBIDDEN, EXCEPT BY SPECIFIC WRITTEN PERMISSION FROM NYLOPLAST. ©2010 NYLOPLAST

DRAWN BY	CJA	MATERIAL	
DATE	9-30-99	PROJECT NO./NAME	
REVISED BY	EBC		
DATE	3-17-10		
DWG SIZE	A	SCALE	1:25 SHEET 1 OF 1

3130 VERONA AVE
BUFORD, GA 30518
PHN (770) 932-2443
FAX (770) 932-2490
www.nyloplast-us.com

Nyloplast

TITLE
8 IN - 30 IN BODY TO ADAPTER DIMENSIONS

DWG NO. 7002-110-003 REV F



CITY OF DE PERE

ENGINEERING DIVISION 925 S. SIXTH ST DE PERE WI 54115
OFFICE 920-339-4061 FAX 920-339-4071

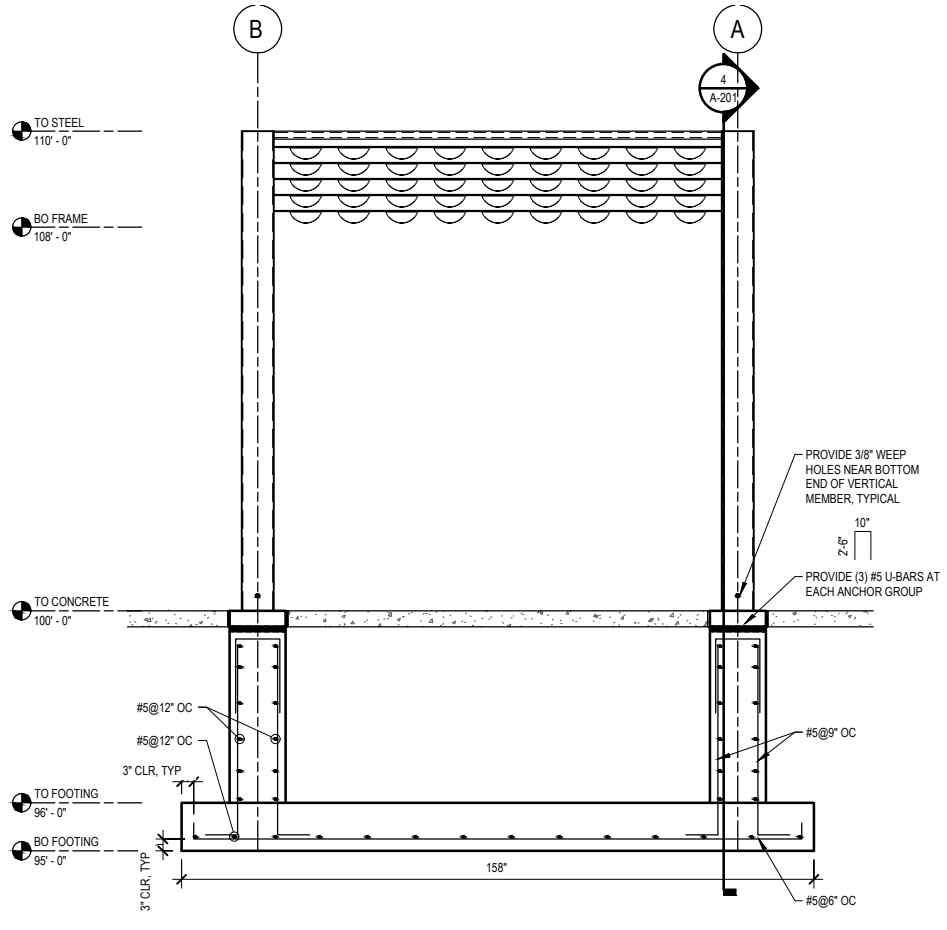
**CONSTRUCTION DETAILS
NYLOPLAST YARD DRAIN**

NAME:
STREET RECONSTRUCTION AND
UTILITY RELAY
PROJECT # 20-02

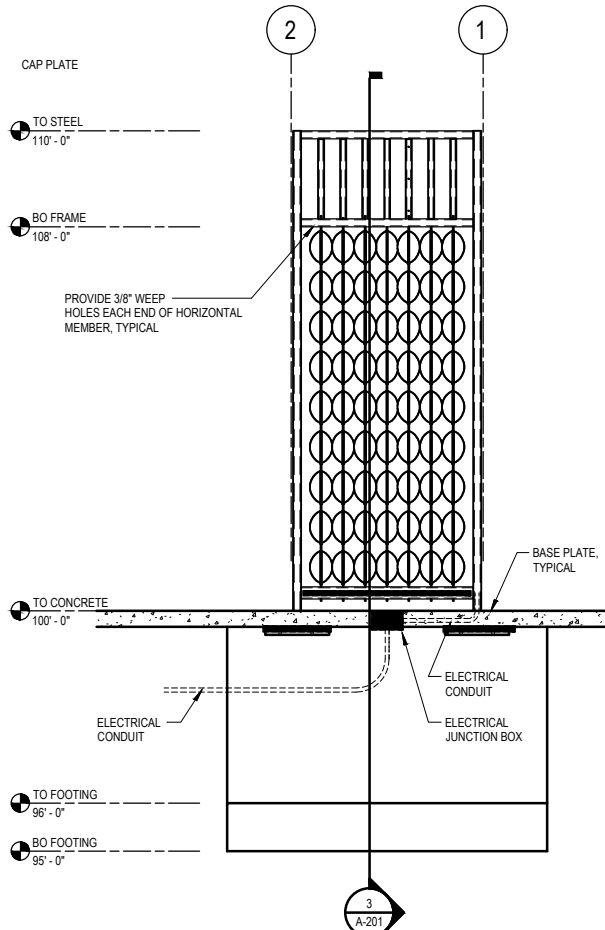
BY	DATE	REVISIONS / ISSUES	
		NO.	DATE
SURVEYED			
DRAWN	KAD	2-2020	
DESIGNED			
CHECKED	EPR	2-2020	

X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200-CAD\Standard Detail Drawings.dwg

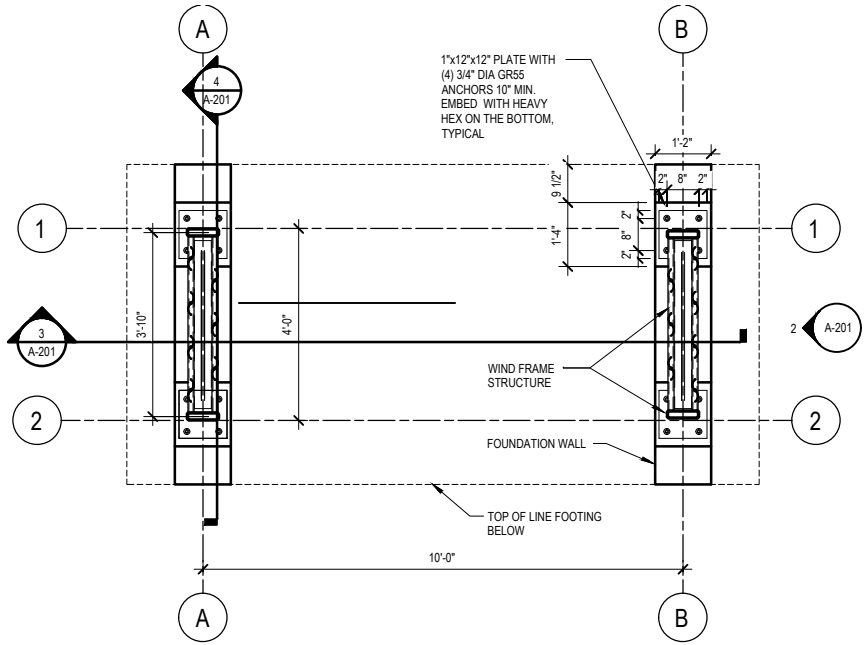
NOT FOR CONSTRUCTION - COST REVIEW SET



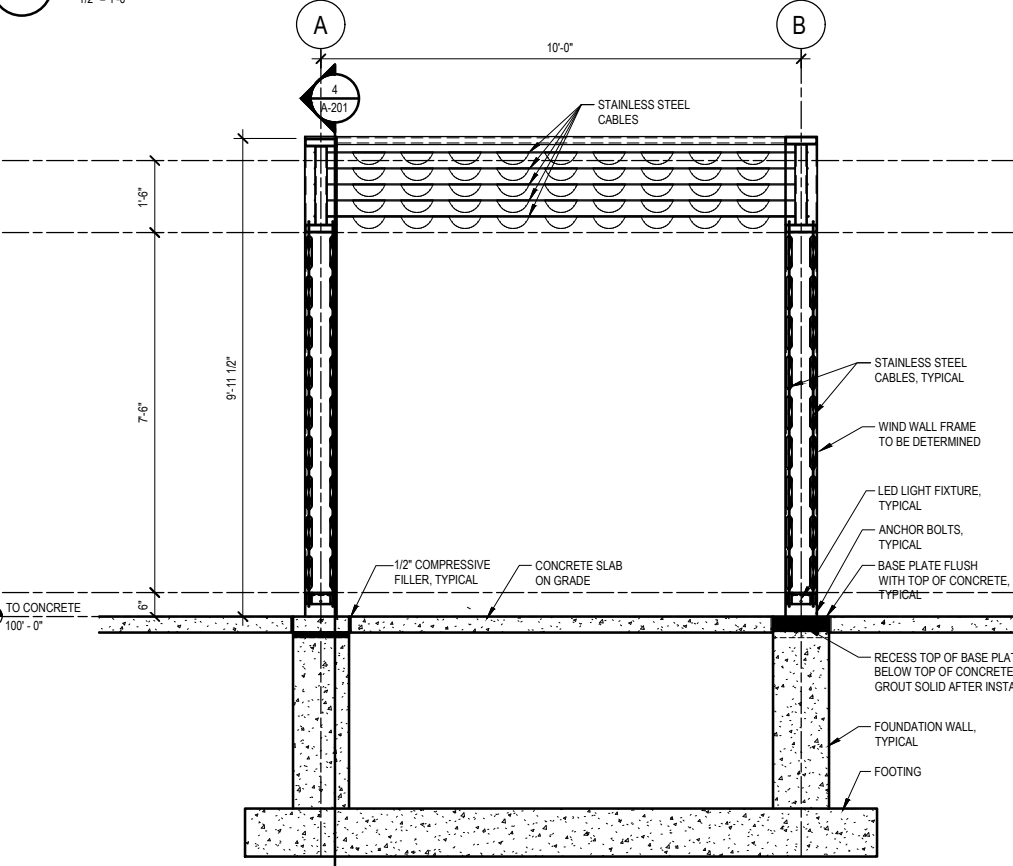
1 EAST ELEVATION / FOUNDATION SECTION
1/2" = 1'-0"



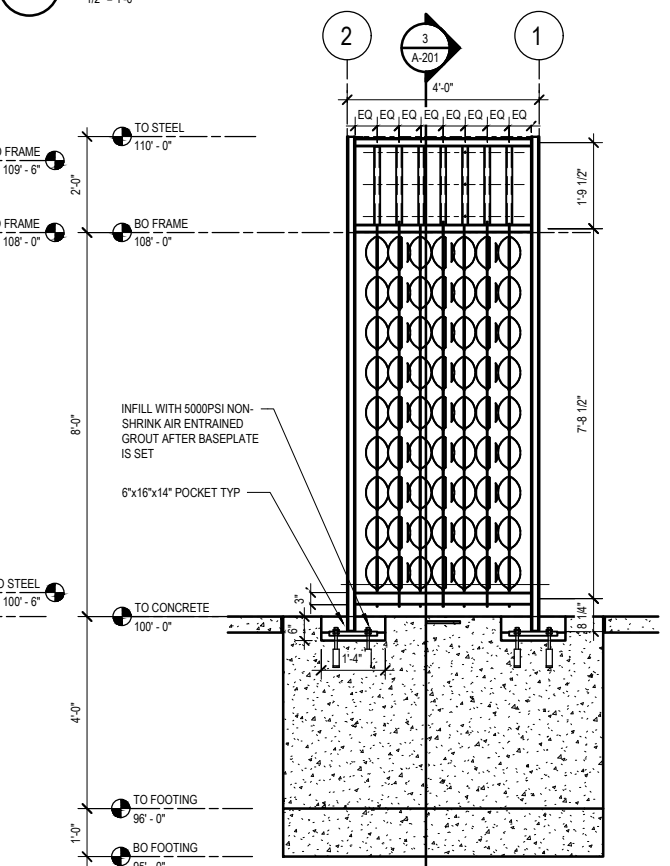
2 SOUTH ELEVATION
1/2" = 1'-0"



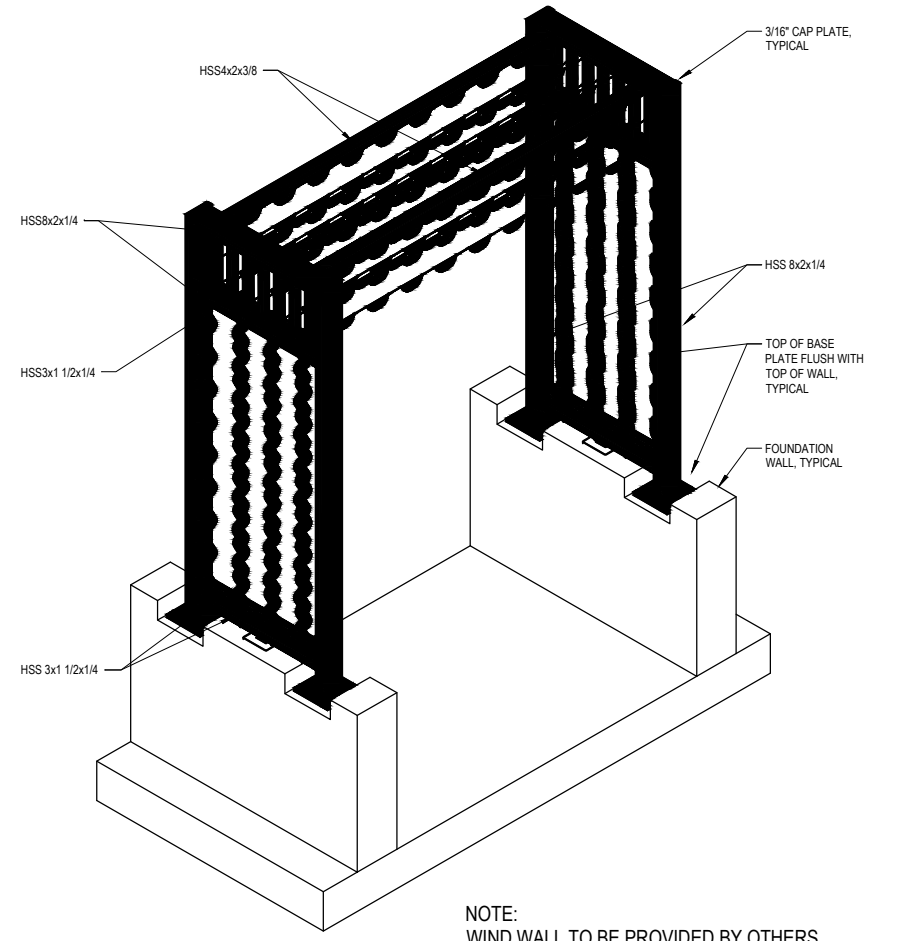
6 FLOOR PLAN
1/2" = 1'-0"



3 SECTION 1
1/2" = 1'-0"



4 SECTION 2
1/2" = 1'-0"



5 ISOMETRIC

NOTE:
WIND WALL TO BE PROVIDED BY OTHERS

ELECTRICAL SYMBOLS AND ABBREVIATIONS

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS INDICATED HERE ARE USED IN DRAWINGS AND MAY NOT APPLY TO CURRENT PROJECT. ADDITIONAL SYMBOLS MAY BE INDICATED ON DRAWINGS.

ELECTRICAL ABBREVIATIONS

1P - ONE POLE	KVAR - KILOVOLT AMPERE REACTIVE
2P - TWO POLE	KW - KILOWATT
3P - THREE POLE	LP - LIGHTING PANEL
4P - FOUR POLE	LS - LIMIT SWITCH
1P,1W - ONE POLE, ONE WIRE	LV - LIGHTING
1P,2W - ONE POLE, TWO WIRE	LV - LOW VOLTAGE
2P,2W - TWO POLE, TWO WIRE	MIC - MECHANICAL CONTRACTOR
2P,3W - TWO POLE, THREE WIRE	MCA - MINIMUM CIRCUIT AMPS
3P,2W - THREE POLE, TWO WIRE	MCC - MOTOR CONTROL CENTER
3P,3W - THREE POLE, THREE WIRE	MDP - MAIN DISTRIBUTION PANEL
3P,4W - THREE POLE, FOUR WIRE	MISC - MISCELLANEOUS
4P,4W - FOUR POLE, FOUR WIRE	MH - MANHOLE
A - AMPERE	MLO - MAIN LUGS ONLY
AC - ALTERNATING CURRENT	MTD - MOUNTED
AF - AMPERE FRAME	MTG - MOUNTING
AF - ABOVE FINISHED FLOOR	MTS - MANUAL TRANSFER SWITCH
AFG - ABOVE FINISHED GRADE	MW - MICROWAVE
AIC - AMPERE INTERRUPTING CAPACITY	N/A - NOT APPLICABLE
AL - ALUMINUM	NV - MEDIUM VOLTAGE
AS - AMP SWITCH	NC - NORMALLY CLOSED
AT - AMP TRIP	NEC - NATIONAL ELECTRIC CODE
ARCH - ARCHITECT	NEC - NOT IN CONTRACT
ATS - AUTOMATIC TRANSFER SWITCH	NO - NORMALLY OPEN
A/V - AUDIO VISUAL	# - NUMBER
B - PEDESTAL MOUNTED ON BENCH TOP	NTS - NOT TO SCALE
BF - BELOW FLOOR	P - POLE
BFF - BELOW FINISHED FLOOR	PB - PULL BOX
BFG - BELOW FINISHED GRADE	PC - PLUMBING SYSTEM CONTRACTOR
BLDG - BUILDING	PH - PHASE
C - CONDUIT	PNL - PANEL OR PANELBOARD
CAT - CATALOG	PP - POWER PANEL
CATV - CABLE TELEVISION	PR - PAIR
CB - CIRCUIT BREAKER	PRI - PRIMARY
CKT - CIRCUIT	PVC - POLYVINYL CHLORIDE
CLG - CEILING MOUNTED	REC - RECESSED
CO - COPIER	REF - REFRIGERATOR
CT - CURRENT TRANSFORMER	RSC - RIGID STEEL CONDUIT
CU - COPPER	SC - SECURITY CONTRACTOR
CL - CENTERLINE	SEC - SECONDARY
DC - DIRECT CURRENT	SN - SOLID NEUTRAL
DR - DRYER	SP - SPARE
Δ - DELTA	SS - STAINLESS STEEL
DISC - DISCONNECT	ST - SHUNT TRIP
DW - DISHWASHER	STP - SHIELDED TWISTED PAIR
DWG - DRAWING	SUSP - SUSPENDED
E - EMERGENCY	SW - SWITCH
EC - ELECTRICAL CONTRACTOR	SWBD - SWITCHBOARD
EMT - ELECTRIC METALLIC TUBING	T - TAMPER RESISTANT SAFETY RECEPTACLE
ETR - EXISTING TO REMAIN	TC - TELEPHONE CABINET
ERLD - EXISTING TO BE RELOCATED	TCI - TELECOMMUNICATIONS CABLING INSTALLER
ERLD - RELOCATED EQUIPMENT'S NEW LOCATION	TELE / DATA - TELEPHONE / DATA
EWC - ELECTRIC WATER COOLER	TEL - TELEPHONE
EX - EXISTING	TELECOM - TELECOMMUNICATIONS
FA - FIRE ALARM	TP - TWISTED PAIR
FLA - FULL LOAD AMPS	TYP - TYPICAL
FO - FIBER OPTIC	UG - UNDERGROUND
FPC - FIRE PROTECTION CONTRACTOR	UTP - UNSHIELDED TWISTED PAIR
GC - GENERAL CONTRACTOR	UOI - UNLESS OTHERWISE INDICATED
GFCI - GROUND FAULT CIRCUIT INTERRUPTER	V - VOLT
GFPE - GROUND FAULT PROTECTION EQUIPMENT	W - WATT
GND - GROUND	WA - WASHER
GRC - GALVANIZED RIGID CONDUIT	WP - WEATHERPROOF
HH - HANDHOLE	XFMR - TRANSFORMER
HP - HORSEPOWER	XR - XRAY
HVAC - HEATING, VENTILATING, AND AIR CONDITIONING	XV - XRAY VIEWER
HZ - HERTZ (CYCLE) PER SECOND	Y - WYE
JB - JUNCTION BOX	ZAM - ZONE ADAPTER MODULE
KVA - KILOVOLT AMPERE	

GENERAL SYMBOLS

	DETAIL REFERENCE - TOP DESIGNATES DETAIL NUMBER - BOTTOM DESIGNATES SHEET NUMBER		EQUIPMENT REFERENCE - TOP DESIGNATES EQUIPMENT TYPE: (LP) LIGHTING PANEL (MDP) MAIN DISTRIBUTION PANEL (MSB) MAIN SWITCHBOARD PANEL (PP) POWER PANEL (RC) RELAY CABINET (RP) RECEPTACLE PANEL (LCP) LIGHTING CONTROL PANEL (T) TRANSFORMER - BOTTOM DESIGNATES EQUIPMENT ID
	DETAIL COVERAGE AREA		
	SECTION REFERENCE - TOP DESIGNATES SECTION NUMBER - BOTTOM DESIGNATES SHEET NUMBER		

LIGHTING FIXTURES

	SURFACE MOUNTED		SURFACE MOUNTED ACCENT - CHEVRON INDICATES DIRECTION OF ILLUMINATION
	RECESS MOUNTED		RECESS MOUNTED ACCENT - CHEVRON INDICATES DIRECTION OF ILLUMINATION
	WALL MOUNTED		EMERGENCY BATTERY UNIT - DUAL LIGHTING HEADS
	SUSPENDED, PENDENT, CHAIN, STEM, OR CABLE HUNG		EMERGENCY BATTERY REMOTE - SINGLE LIGHTING HEAD
	POLE MOUNTED WITH ARM		EMERGENCY BATTERY REMOTE - DUAL LIGHTING HEADS
	POST TOP MOUNTED		EXIT LIGHT FIXTURE - CEILING MOUNTED - SHADING INDICATES FACE(S) - ARROW(S) AND FACE(S) AS INDICATED ON DRAWINGS
	IN-GROUND OR IN-FLOOR MOUNTED		EXIT LIGHT FIXTURE - END MOUNTED - SHADING INDICATES FACE(S) - ARROW(S) AND FACE(S) AS INDICATED ON DRAWINGS
	SINGLE HEAD SPOT OR FLOOD		LIGHTING TRACK - LENGTH AS INDICATED ON DRAWINGS - NUMBER AND DIRECTION OF FIXTURES AS INDICATED ON DRAWINGS AND / OR SCHEDULE
	DOUBLE HEAD SPOT OR FLOOD		
	STRIP OR UNDER CABINET		

LIGHTING FIXTURE DESIGNATIONS

	SHADING INDICATES FIXTURE FULLY WIRED TO EMERGENCY OR UNSWITCHED NIGHT LIGHTING CIRCUIT		PARTIAL SHADING INDICATES FIXTURE PARTIALLY WIRED TO EMERGENCY OR NIGHT LIGHTING CIRCUIT
	LIGHT FIXTURE DESIGNATION - (A) INDICATES FIXTURE TYPE (SEE SCHEDULE) - (1) INDICATES CIRCUIT NUMBER (PANEL BOUNDS AS INDICATED ON DRAWINGS) - (b) INDICATES CONTROL DESIGNATION (IF NOT INDICATED, CONTROLLED VIA SWITCH AT ROOM ENTRY) - (NL) INDICATES UNSWITCHED NIGHT LIGHTING		CONTACTOR DESIGNATION (SEE SCHEDULE) CONTROLLED VIA CONTACTOR

WIRING DEVICES

	DUPLEX RECEPTACLE - MOUNTED 1'-6" AFF, UOI - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS) - (Y) INDICATES TYPE: (GFCI) GROUND FAULT CIRCUIT INTERRUPTING (WP) WEATHERPROOF (WR) WEATHER RESISTANT		DUPLEX RECEPTACLE - TOP HALF SWITCHED - MOUNTED 1'-6" AFF, UOI - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS)		SPECIAL PURPOSE OUTLET - (X) INDICATES DEVICE IDENTIFICATION (SEE SCHEDULE)
	DUPLEX RECEPTACLE - MOUNTED FLUSH IN COUNTERTOP - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS)		DUPLEX RECEPTACLE - MOUNTED FLUSH IN CEILING - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS)		MOTOR CONNECTION - (X) INDICATES MOTOR IDENTIFICATION (SEE SCHEDULE)
	DUPLEX RECEPTACLE - MOUNTED 6" ABOVE COUNTER BACKSPASH, UOI - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS)		DUPLEX RECEPTACLE - MOUNTED FLUSH IN CEILING - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS)		QUADPLEX RECEPTACLE - MOUNTED 1'-6" AFF, UOI - (X) INDICATES CIRCUIT NUMBER (PANEL BOUNDARY AS INDICATED ON DRAWINGS)

EQUIPMENT AND PANELBOARDS

	GENERATOR		CURRENT TRANSFORMER CABINET		POWER POLE - (X) INDICATES CIRCUIT DEVICES AS INDICATED ON DRAWINGS AND / OR IN SPECIFICATION
	TRANSFORMER - MOUNTED ON 4" CONCRETE PAD, UOI - (X) INDICATES MOUNTING TYPE: (W) WALL (S) SURFACE		METER		TELECOMMUNICATIONS / POWER POLE - (X) INDICATES CIRCUIT DEVICES AS INDICATED ON DRAWINGS AND / OR IN SPECIFICATION
	TRANSFORMER - PAD MOUNTED		BRANCH PANELBOARD - RECESSED MOUNTED - (SEE SCHEDULE)		BRANCH PANELBOARD - SURFACE MOUNTED - (SEE SCHEDULE)
			DISTRIBUTION PANELBOARD - (SEE ONE-LINE)		

MOTOR STARTERS AND DISCONNECTS

	MOTOR STARTER - MANUAL		DISCONNECT SWITCH		HAND-OFF-AUTO (HOA) STATION
	MOTOR STARTER - MAGNETIC - (X) INDICATES MOTOR STARTER CONTROLLED (SEE SCHEDULE)		DISCONNECT SWITCH - FUSED		
	COMBINATION MOTOR STARTER - (X) INDICATES MOTOR STARTER CONTROLLED (SEE SCHEDULE)				

LIGHTING CONTROL

	SWITCH - MOUNTED 3'-8" AFF, UOI - (a) INDICATES SWITCH DESIGNATION - SINGLE POLE, UOI - (X) INDICATES SWITCH TYPE: (2) TWO POLE (3) THREE WAY (4) FOUR WAY (DLS) DUAL LEVEL SWITCH (K) KEY OPERATED (P) WITH PILOT LIGHT (T) TIMER		SWITCH STATION - LOW VOLTAGE - (X) INDICATES STATION IDENTIFIER: (X) FOR (4) OR MORE SWITCHES AT SINGLE LOCATION (SEE SCHEDULE) (Xa,Xb,Ya) FOR (3) OR FEWER SWITCHES AT SINGLE LOCATION WITH SINGLE RELAYS OR PARTITIONS OF CIRCUIT BEING CONTROLLED (Xa) FOR SINGLE SWITCH CONTROLLING SINGLE RELAY (X,Y)a) FOR SINGLE SWITCH CONTROLLING MULTIPLE CIRCUITS		OCCUPANCY SENSOR - CEILING MOUNTED - (X) INDICATES TYPE (SEE SCHEDULE)
	SWITCH - MOMENTARY CONTACT - MOUNTED 3'-8" AFF, UOI - (X) INDICATES SYSTEM DESIGNATION		OCCUPANCY SENSOR - WALL MOUNTED - 3'-8" AFF, UOI		CONTACTOR - (X) INDICATES TYPE (SEE SCHEDULE)
	RELAY CABINET/ LIGHTING CONTROL CABINET - (SEE SCHEDULE)		TIME CLOCK - (X) INDICATES TYPE (SEE SCHEDULE)		PHOTOCELL
			DAYLIGHT SENSOR		

X:\ENG\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James\E002 - ELECTRICAL SITE PLAN 2/17/2020 1:18 PM

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

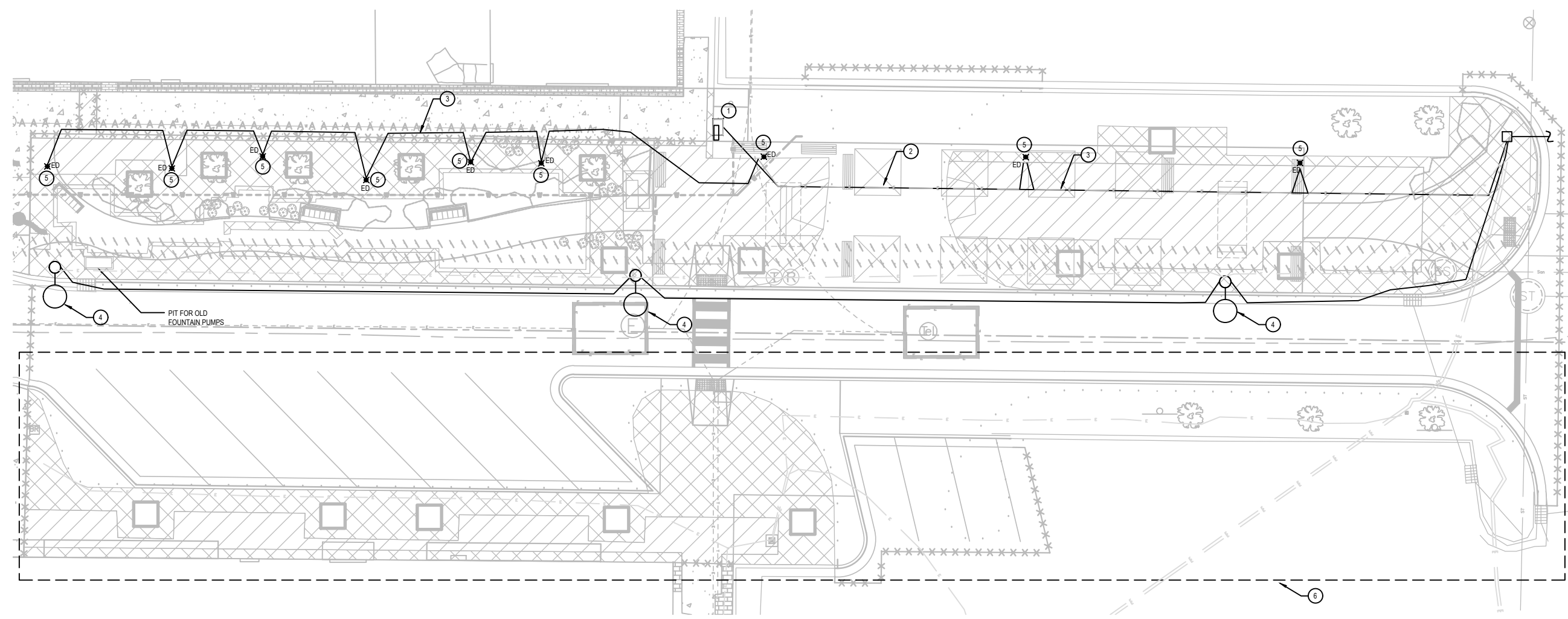
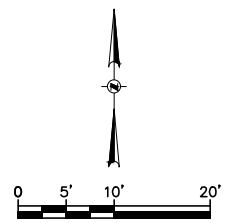
PROJECT NUMBER: 2018-1013
 DATE: 03-28-19
 DRAWN BY: SJS
 CHECKED BY: DJK
 APPROVED BY: PJS
 SCALE: As Noted

SHEET TITLE:

SITE ELECTRICAL PLAN -
DEMOLITION

SHEET NUMBER:

E002



ABBREVIATIONS:

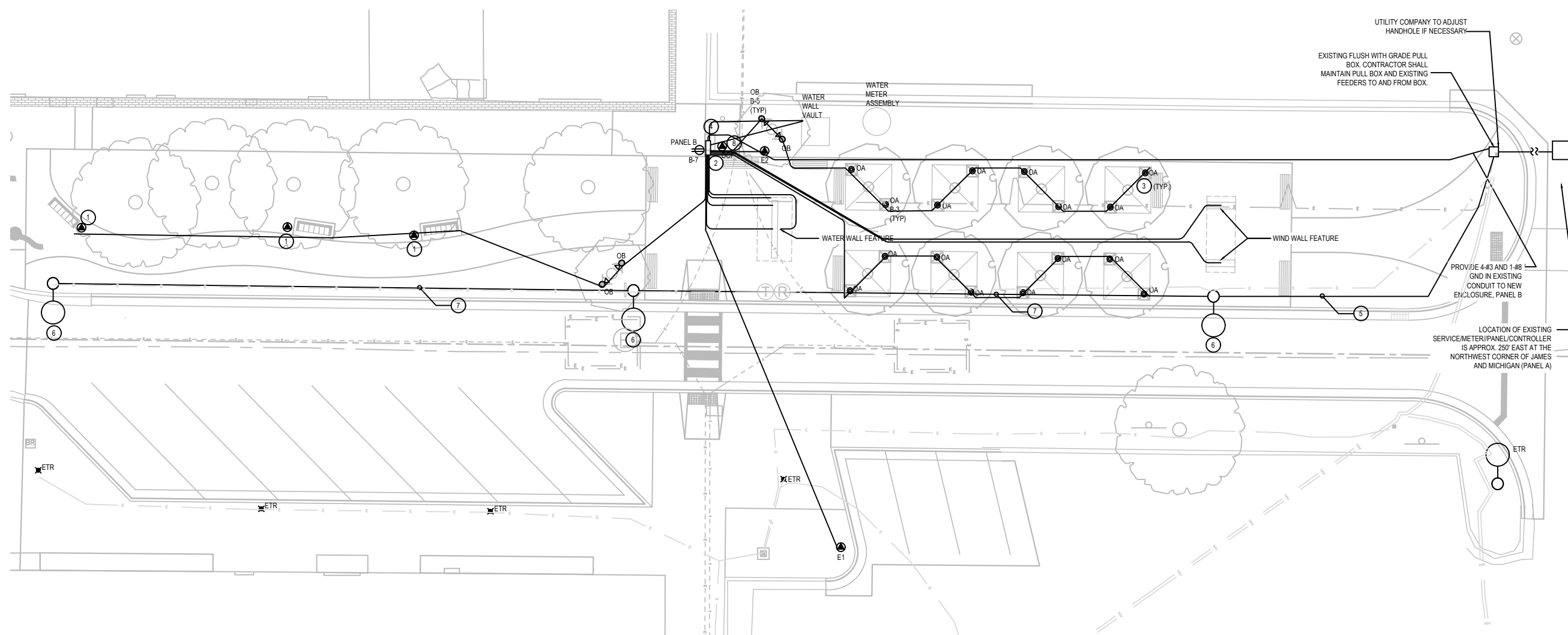
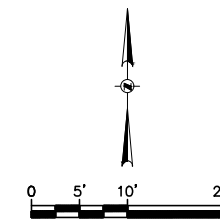
- 1. ED - EXISTING TO BE DEMOLISHED

GENERAL NOTES:

- ALL ELECTRICAL EQUIPMENT SHOWN ON THIS DEMOLITION PLAN IS SCHEDULED FOR DEMOLITION UNLESS NOTED OTHERWISE. IN ADDITION TO REMOVING DEVICES, REMOVE ALL ABANDONED ELECTRICAL CIRCUITS BACK TO THEIR SOURCE. REMOVE LIGHT FIXTURES WITH CARE AND TURN OVER TO THE CITY. REFER TO THE SPECIFICATIONS FOR ADDITIONAL ELECTRICAL DEMOLITION REQUIREMENTS.
- REFER TO DEMOLITION DRAWINGS OF OTHER TRADES. WHERE MOTORS, CONTROL PANELS, AND OTHER LOADS THAT HAVE AN ELECTRICAL CONNECTION ARE BEING REMOVED, INCLUDE THE DISCONNECTION AND REMOVAL OF ASSOCIATED ELECTRICAL FEEDS, CIRCUITS, AND LOOSE CONTROL EQUIPMENT IN THIS CONTRACT.

KEYED NOTES:

- EXISTING ENCLOSURE AND CONCRETE PAD SHALL BE REMOVED. EXISTING FEEDERS TO OLD FOUNTAIN LIGHTS SHALL BE REMOVED.
- EXISTING CONDUIT FROM MAIN PANEL "A" TO THIS LOCATION SHALL BE DEMOLISHED.
- EXISTING FEEDERS TO EXISTING FIXTURES SHALL BE DEMOLISHED. CAP AS REQUIRED.
- DISCONNECT, REMOVE, AND STORE EXISTING POLE AND FIXTURE TO ALLOW FOR SANITARY UNDERGROUND WORK. THE CITY WILL PROVIDE A NEW LED FIXTURE.
- EXISTING POLE MOUNTED FIXTURE AND POLE TO BE SALVAGED AND BROUGHT TO THE MSC, 925 S. SIXTH STREET DE PERE, WI. DEMOLISH THE CONCRETE POLE BASE AND LIGHTING BRANCH CIRCUITS TO THIS LIGHT.
- MAINTAIN ALL EXISTING POLE MOUNTED LIGHTS, POLES, POLE BASES, PULL BOXES, FEEDERS AND BRANCH CIRCUITS IN THIS AREA.



ABBREVIATIONS:

- 1. ETR - EXISTING TO REMAIN

GENERAL NOTES:

- 1. ALL WIRING SHALL BE TWHN TYPE.
- 2. TYPE OB FIXTURES SHALL BE LOCATED 30" O.C. FROM CENTER OF TREE IN ORIENTATION AS SHOWN. (TYP.)
- 3. SEE F300 THROUGH F303 FOR ADDITIONAL ELECTRICAL INFORMATION.

KEYED NOTES:

- 1. ILLUMINATED BENCH. PROVIDE 3 - #12S IN 1" CONDUIT VERIFY WIRING REQUIREMENTS WITH MANUFACTURER SPECIFICATIONS.
- 2. PROVIDE PHOTOCELL CONTROL FOR ALL NEW FIXTURES WITH TIMECLOCK OVERRIDE. TIMECLOCK TO TURN THE FIXTURES OFF BETWEEN 12:00AM AND 4:00AM OR AT A TIME DIRECTED BY AHJ.
- 3. LIGHT FIXTURES ARE INTEGRAL TO DECORATIVE TREE GRATES. LOCATE EACH AS SHOWN AND PER APPROVED SHOP DRAWINGS. COORDINATE INSTALLATION WITH GRATES AS REQUIRED. REFER TO SPEC. SECTION 12 93 00 SITE FURNISHINGS FOR ADDITIONAL INFORMATION. PROVIDE 12V LOW VOLTAGE TRANSFORMER AS REQUIRED.
- 4. PANEL "B" LOCATION IN NEMA 4 CABINET, 72 IN. H X 37 IN. W X 24 IN. D, HOFFMAN #A72H3724FS3PT-A72P36F1 OR EQUAL. PROVIDE NEW CONCRETE PAD (6'X6'X8") FOR NEW ENCLOSURE. INCLUDE NEW PANEL PER SCHEDULE, AND RELAY PANEL. ACUITY BLUE BOX LT #GR1408LT INT OR EQUAL, WITH MIN. 8 RELAYS FOR CONTROL OF LIGHTING, LIGHTED BENCHES, AND SPARE RELAY(S).

KEYED NOTES:

- 5. EXTEND EXISTING LIGHTING BRANCH CIRCUIT AND CONDUIT TO POLE MOUNTED FIXTURE.
- 6. UPON COMPLETION OF SANITARY LINE INSTALLATION, REINSTALL EXISTING POLE MOUNTED FIXTURES AND POLE AS NEW. PROVIDE NEW CONCRETE BASE. EXTEND EXISTING LIGHTING BRANCH CIRCUIT THROUGH CONCRETE BASE AND UP TO FIXTURE. CIRCUIT TO AND CONTROL WITH EXISTING LIGHTING CIRCUIT.
- 7. CONTINUE TO EXTEND EXISTING LIGHT BRANCH CIRCUIT TO REINSTALLED POLE MOUNTED FIXTURES.
- 8. REFER TO DELTA FOUNTAINS DRAWINGS FOR ADDITIONAL WIRING REQUIREMENTS BETWEEN FOUNTAIN CONTROL, WATER FEATURE, VAULT, AND WINDWALL, FOR POWER TO VAULT PUMPS/VALVES, POWER/LIGHTING AT WATER FEATURE, LIGHTING AT WINDWALL, GROUNDING REQUIREMENTS, DETAILS, AND OTHER FOUNTAIN MANUFACTURER ELECTRICAL REQUIREMENTS.



1150 Springhurst Drive,
Suite 201
Green Bay, WI 54304-5947
920 / 592 9440
920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND
UTILITY RELAY

400 James Street
De Pere, WI 54115

NO. DATE REVISIONS BY
2/4/20 CITY OF DE PERE
MODIFICATIONS

PROJECT INFORMATION:

PROJECT NUMBER: 2018-1013
DATE: 03-28-19
DRAWN BY: SJS
CHECKED BY: DJK
APPROVED BY: PJS
SCALE: As Noted

SHEET TITLE:

ELECTRICAL SCHEDULES

SHEET NUMBER:

E601

SPECIAL PURPOSE OUTLET SCHEDULE

#	SERVING	LOAD	VOLT	PHASE	LOCATION	FEED FROM		WIRING			SEE NOTE	
						PANEL	CIRCUIT	#	SIZE	GND		CONDUIT
E1	EVENT POWER		120	1	SITE	B	6,8	2	12	12	1"	1
E2	EVENT POWER		120	1	SITE	B	10,12	2	12	12	1"	1
DCP	DELTA FOUNTAIN CONTROL PANEL		208	3	SITE	B	9,11,13	4	10	10	1"	
	ILLUMINATED BENCH(S)		120	1	SITE	B	1	2	12	12	1"	

SPECIAL PURPOSE OUTLET SCHEDULE NOTES:

1. PROVIDE 2 DEDICATED CIRCUITS AT EACH LOCATION. PROVIDE LEGRAND OUTDOOR BOX CAT# XB814C520C2BN. PROVIDE GFCI OVERCURRENT DEVICE FOR EACH CIRCUIT. ALLOW FOR AV CAPACITY IN SEPARATE OUTDOOR BOX OR COMBINATION SINGLE CIRCUIT DUPLEX AND AV CONNECTION. VERIFY WITH OWNER POWER/AV REQUIREMENTS PRIOR TO ORDERING.

LIGHT FIXTURE SCHEDULE

DES	PERFORMANCE DATA		DESCRIPTION	LIGHT FIXTURE		VOLT	LED DRIVER		MOUNT	DEPTH	OPTIONS / ACCESSORIES	ACCEPTABLE MANUFACTURERS	SEE NOTE
	LUMENS	SYSTEM WATTAGE		MANUFACTURER	CATALOG SERIES		INTEGRAL	REMOTE					
	OA	-		7W	IN GRADE UPLIGHT		IRONSMITH	TGL-5DF					
OB	-	4.5W	ON GRADE FLOODLIGHT	VISTA	GR-5006-Z-4.5-W-25-FR	120	YES		S	6"			

NOTE: SEE SPECIFICATION SECTIONS FOR ADDITIONAL INFORMATION REGARDING FIXTURE AND INSTALLATION REQUIREMENTS. PROVIDE OPTIONS AND ACCESSORIES REFERENCED BY THE COLUMN TITLED "OPTIONS / ACCESSORIES". MANUFACTURERS LISTED AS ACCEPTABLE SHALL MEET ALL REQUIREMENTS AND FEATURES INDICATED. ACCEPTABLE MANUFACTURERS MUST MEET THE PHOTOMETRIC PERFORMANCE OF THE LISTED UNIT.

CEILING TYPE ABBREVIATIONS:

DW = DRYWALL
ES = EXPOSED STRUCTURE
LG = LAY-IN GRID
P = PENDANT
PL = PLASTER
PO = POLE
R = RECESSED
S = SURFACE
V = VARIES
W = WALL MOUNTED

OPTIONS/ACCESSORIES:

SG = SINGLE GASKETED DOOR FRAME
DG = DOUBLE GASKETED DOOR FRAME
TG = TRIPLE-GASKETED DOOR FRAME, LENS, AND BODY
WL = WET LOCATION CONSTRUCTION
DL = DAMP LOCATION CONSTRUCTION
SS = STAINLESS STEEL TRIM AND DOOR FRAME
CA = CLEAR ALZAK REFLECTOR
GA = GOLD ALZAK REFLECTOR
BA = BLACK ALZAK REFLECTOR
BM = BLACK MILL GROOVE BAFFLE
BP = AUXILIARY EMERGENCY BATTERY PACK
WG = WIRE GUARD
CH = CHAIN MOUNTING ACCESSORIES
PA = PATTERN 12 ACRYLIC LENS - .125" MINIMUM THICKNESS
PC = PHOTOCELL
NTC = TRIM SUITABLE WITH NARROW TEE CEILING SUSPENSION SYSTEM
CUS = CUSTOM PAINTED FINISH - COLOR AS SELECTED BY ARCH.
IOC = INTEGRAL OCCUPANCY SENSOR
DIM = DIMMABLE

LIGHT FIXTURE SCHEDULE NOTES:

1. OA TYPE FIXTURE IS SUPPLIED WITH LANDSCAPE GRATE. THIS CONTRACTOR SHALL RECEIVE LIGHTS FROM LANDSCAPE CONTRACTOR AND INSTALL. SEE LANDSCAPE SITE FURNISHINGS SPECIFICATION SECTION FOR ADDITIONAL INFORMATION.

PANELBOARD SCHEDULE: 'NEW' B

VOLTAGE:	208/120	MAIN TYPE:	MCB	BUS MATERIAL:	COPPER
PHASE/WIRE:	3P / 4W	MAIN RATING:	100 AMPS	BUS RATING:	100 AMPS
SVC. ENTRANCE LABEL:	NO	TVSS:	NO	ENCLOSURE:	NEMA 3R
MINIMUM AIC:	10,000 AMPS	FEED-THRU LUGS:	NO	200% NEUTRAL:	NO
IS SERIES RATED ALLOWED:	NO	MOUNTING:	SURFACE	PANELBOARD TYPE:	BRANCH CIRCUIT

CCT #	LOAD TYPE	LOAD DESCRIPTION	VA	TRIP/ POLE		TRIP/ POLE	VA	LOAD TYPE	LOAD DESCRIPTION	CCT #	
1	L	LIGHTING (BENCHES)	200	20/1	A	A	20/1	200	R	WIND WALL	2
3	R	3 OUTLETS (BENCHES)	360	20/1	B	B	20/1	200	R	WIND WALL	4
5	L	LIGHTING - TREES	100	20/1	C	C	20/1	360	R	NORTH EVENT BOX	6
7	L	LIGHTING - TREES	200	20/1	A	A	20/1	360	R	NORTH EVENT BOX	8
9	R	ENCLOSURE OUTLET (PANEL B)	360	20/1	B	B	20/1	360	R	SOUTH EVENT BOX	10
11	R	WATER FEATURE CONTROL	1,333	30/3	C	C	20/1	360	R	SOUTH EVENT BOX	12
13	-		1,333	-	A	A	20/1		R	SPARE	14
15	-		1,333	-	B	B	20/1		R	SPARE	16
17					C	C	20/1		R	SPARE	18
19					A	A	20/1		R	SPARE	20
21					B	B					22

ABBREVIATIONS:

ST = SHUNT TRIP
GFCI = GROUND FAULT CIRCUIT INTERRUPTER
HACR = HEATING AND AIR-CONDITIONING RATED
HB = HANDLE-BLOCKING DEVICE

PHASE

LOAD TYPE ABBREVIATIONS

R = RECEPTACLE
L = LIGHTING
E = EQUIPMENT
M = MOTOR
LM = LARGEST MOTOR
K = KITCHEN

TOTAL CONNECTED (VA):

TOTAL CONNECTED (A):

TOTAL DEMAND (VA):

TOTAL DEMAND (A):

PANEL SCHEDULE NOTES:

1. CONTRACTOR TO VERIFY TOTAL CONNECTED (VA), TOTAL CONNECTED (A), TOTAL DEMAND (VA) AND TOTAL DEMAND (A).

PANELBOARD SCHEDULE: 'EXISTING' A

VOLTAGE:	208/120	MAIN TYPE:	MCB	BUS MATERIAL:	COPPER
PHASE/WIRE:	3P / 4W	MAIN RATING:	200 AMPS	BUS RATING:	200 AMPS
SVC. ENTRANCE LABEL:	NO	TVSS:	NO	ENCLOSURE:	NEMA 3R
MINIMUM AIC:	10,000 AMPS	FEED-THRU LUGS:	NO	200% NEUTRAL:	NO
IS SERIES RATED ALLOWED:	NO	MOUNTING:	SURFACE	PANELBOARD TYPE:	BRANCH CIRCUIT

CCT #	LOAD TYPE	LOAD DESCRIPTION	TRIP	POLE		TRIP	POLE	LOAD TYPE	LOAD DESCRIPTION	CCT #
1		EXISTING LIGHTING	30	1	A	A	30	1	EXISTING LIGHTING	2
3		EXISTING LIGHTING	30	1	B	B	30	1	EXISTING LIGHTING	4
5		EXISTING LIGHTING	30	1	C	C	30	1	EXISTING LIGHTING	6
7		EXISTING LIGHTING	30	1	A	A	30	1	EXISTING LIGHTING	8
9		EXISTING LIGHTING	30	1	B	B	30	1	EXISTING LIGHTING	10
11		EXISTING LIGHTING	30	1	C	C	30	1	EXISTING LIGHTING	12
13		EXISTING LIGHTING	30	1	A	A	30	1	EXISTING LIGHTING	14
15		SPARE	40	2	B	B	15	1	EXISTING PHOTOCELL	16
17		-	-	-	C	C	40	2	SPARE	18
19		SPACE			A	A	-	-	-	20
21		SPACE			B	B			SPACE	22
23		SPACE			C	C			SPACE	24
25		PANEL B (1)	60	3	A	A			SPACE	26
27		-	-	-	B	B			SPACE	28
29		-	-	-	C	C			SPACE	30

ABBREVIATIONS:

ST = SHUNT TRIP
GFCI = GROUND FAULT CIRCUIT INTERRUPTER
HACR = HEATING AND AIR-CONDITIONING RATED
HB = HANDLE-BLOCKING DEVICE

PHASE

LOAD TYPE ABBREVIATIONS

R = RECEPTACLE
L = LIGHTING
E = EQUIPMENT
M = MOTOR
LM = LARGEST MOTOR
K = KITCHEN

TOTAL CONNECTED (VA):

TOTAL CONNECTED (A):

TOTAL DEMAND (VA):

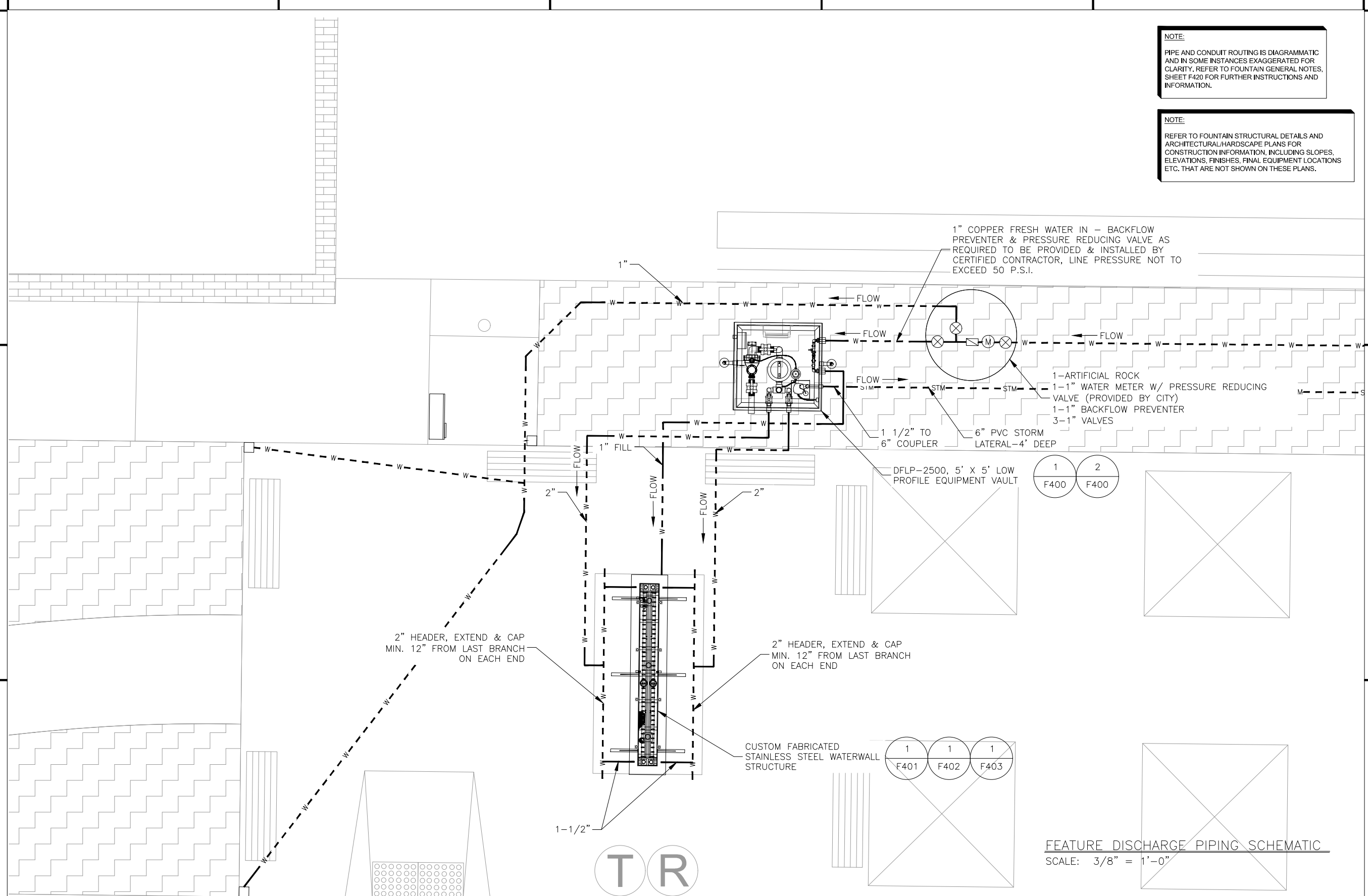
TOTAL DEMAND (A):

PANEL SCHEDULE NOTES:

1. ADD ONE 300A/P BREAKER TO EXISTING PANEL.
2. BALANCE PANEL A.

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.



PROJECT TITLE:

STREET RECONSTRUCTION AND UTILITY RELAY

400 James Street
De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

PROJECT NUMBER:
DATE: 03-28-19
DRAWN BY: JWT
CHECKED BY: DELTA
APPROVED BY:
SCALE: As Noted

SHEET TITLE:

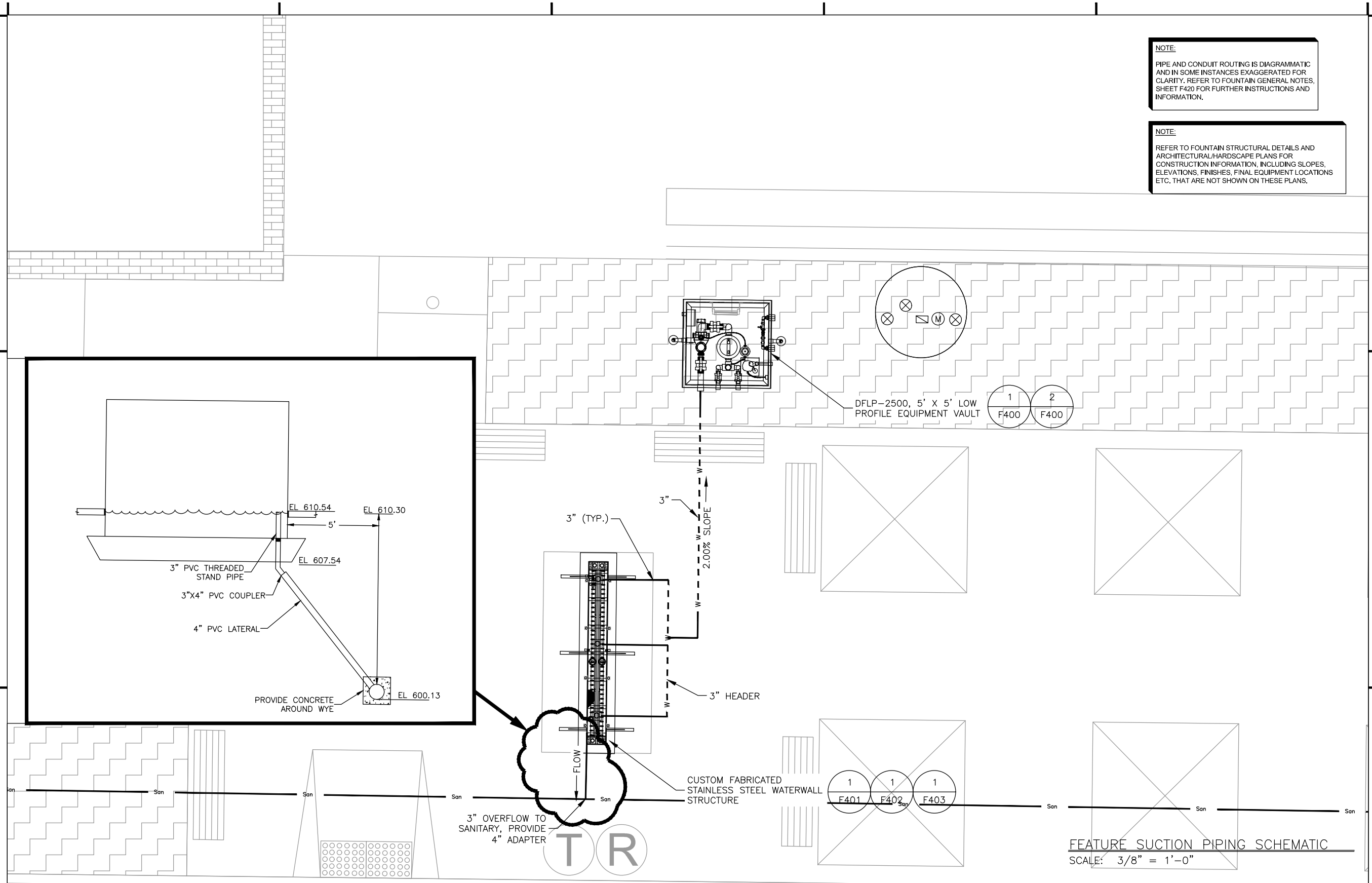
DISCHARGE PIPING SCHEMATIC

SHEET NUMBER:

F100

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC
AND IN SOME INSTANCES EXAGGERATED FOR
CLARITY. REFER TO FOUNTAIN GENERAL NOTES,
SHEET F420 FOR FURTHER INSTRUCTIONS AND
INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND
ARCHITECTURAL/HARDSCAPE PLANS FOR
CONSTRUCTION INFORMATION, INCLUDING SLOPES,
ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS
ETC. THAT ARE NOT SHOWN ON THESE PLANS.



FEATURE SUCTION PIPING SCHEMATIC
SCALE: 3/8" = 1'-0"

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER:	
DATE:	03-28-19
DRAWN BY:	JWT
CHECKED BY:	DELTA
APPROVED BY:	
SCALE:	As Noted

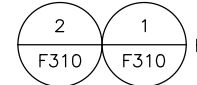
NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL VOLTAGE DROP CALCULATIONS ASSUME 3%VD FROM CONTROL PANEL TO LOAD AND 2%VD FROM SERVICE TO CONTROL PANEL. ALL CONDUIT TO USE LONG RADIUS ELBOWS IN ALL TURNS.

NOTE:
INCOMING POWER PENETRATIONS AND LUGS ARE SIZED FOR SERVICE LOCATED WITHIN 100 FEET. IF THE SERVICE IS LOCATED FARTHER AWAY THAN 100 FEET, NOTIFY DELTA FOUNTAINS SO THAT PENETRATIONS AND LUGS MAY BE DESIGNED TO ACCOMMODATE LARGER WIRES FOR VOLTAGE DROP.

1-1/2" C. 3#12AWG, 1#12G. (FEATURE PUMP), 2#12AWG, 1#12G. (SOLENOID VALVE), 2#12AWG, 1#12G. (SUMP PUMP), 2#12AWG, 1#12G. (EXHAUST FAN)



#8 SOLID COPPER WIRE BOND TO REBAR IN POOL. CONNECT TO REBAR GRID EVERY 100 SQUARE FEET.

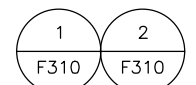


SUPPLY AND INSTALL DISCONNECT MEANS AND BRANCH CIRCUIT OVER-CURRENT PROTECTION RATED AT A MAX 30 AMPS, 208V, 3 PHASE, 4-WIRE. DEVICE SHALL BE A UL LISTED CIRCUIT BREAKER.

FOUNTAIN CONTROL PANEL - MOUNT CONTROL PANEL TO BACKSIDE OF PANEL B

1" CONDUIT FOR TRANSDUCER CABLE, CONFIRM REQUIRED CABLE LENGTH BASE ON CONDUIT ROUTING

4#12AWG, 2#12 GROUND, 1" CONDUIT



#8 SOLID COPPER WIRE BOND TO REBAR IN SLAB. CONNECT TO REBAR GRID EVERY 100 SQUARE FEET. IF EPOXY COATED REBAR IS SPECIFIED, THE CONTRACTOR MUST USE A #8 SOLID COPPER WIRE MESH GRID IN ACCORDANCE WITH N.E.C.

CONDUIT FOR BENCH LIGHTING, SEE SHEET F302 FOR CONTINUATION

2#12AWG, 1#12 GROUND, 1" CONDUIT

2#12AWG, 1#12 GROUND, 1" CONDUIT,

CONDUIT FOR TREE GRATE LIGHTING, SEE SHEET F301 FOR CONTINUATION

4#3AWG, 1#8 GROUND, 1 1/2" CONDUIT

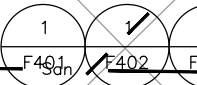


CONDUIT FOR TREE GRATE LIGHTING, SEE SHEET F301 FOR CONTINUATION

2#12AWG, 1#12 GROUND, 1" CONDUIT

2#10AWG, 1#10 GROUND, 1" CONDUIT,

CONDUITS FOR WINDWALL LIGHTING, SEE SHEET F301 FOR CONTINUATION



CUSTOM FABRICATED STAINLESS STEEL WATERWALL STRUCTURE



CONDUIT FOR EVENT LIGHTING SEE PAGE E003

2#12AWG, 1#12 GROUND, 1 1/2" CONDUIT,

FEATURE ELECTRICAL PIPING SCHEMATIC
SCALE: 3/8" = 1'-0"

DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258
V. (904) 886-9030
F. (904) 886-9089

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

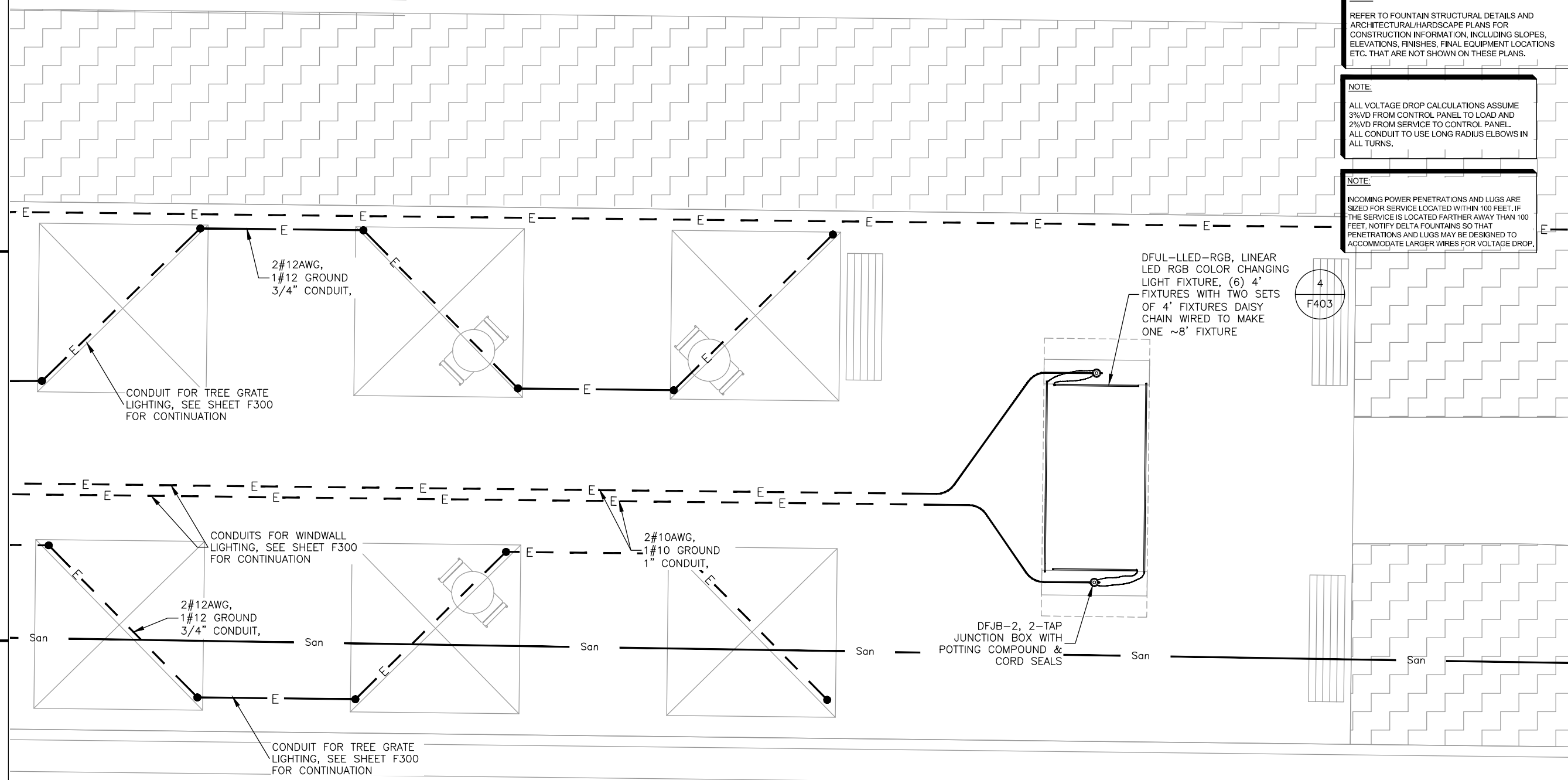
PROJECT NUMBER:	
DATE:	03-28-19
DRAWN BY:	JWT
CHECKED BY:	DELTA
APPROVED BY:	
SCALE:	As Noted

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL VOLTAGE DROP CALCULATIONS ASSUME 3%VD FROM CONTROL PANEL TO LOAD AND 2%VD FROM SERVICE TO CONTROL PANEL. ALL CONDUIT TO USE LONG RADIUS ELBOWS IN ALL TURNS.

NOTE:
INCOMING POWER PENETRATIONS AND LUGS ARE SIZED FOR SERVICE LOCATED WITHIN 100 FEET. IF THE SERVICE IS LOCATED FARTHER AWAY THAN 100 FEET, NOTIFY DELTA FOUNTAINS SO THAT PENETRATIONS AND LUGS MAY BE DESIGNED TO ACCOMMODATE LARGER WIRES FOR VOLTAGE DROP.



DFUL-LLED-RGB, LINEAR LED RGB COLOR CHANGING LIGHT FIXTURE, (6) 4' FIXTURES WITH TWO SETS OF 4' FIXTURES DAISY CHAIN WIRED TO MAKE ONE ~8' FIXTURE

4
F403

DFJB-2, 2-TAP JUNCTION BOX WITH POTTING COMPOUND & CORD SEALS

FEATURE ELECTRICAL PIPING SCHEMATIC
SCALE: 3/8" = 1'-0"

DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER:	
DATE:	03-28-19
DRAWN BY:	JWT
CHECKED BY:	DELTA
APPROVED BY:	
SCALE:	As Noted

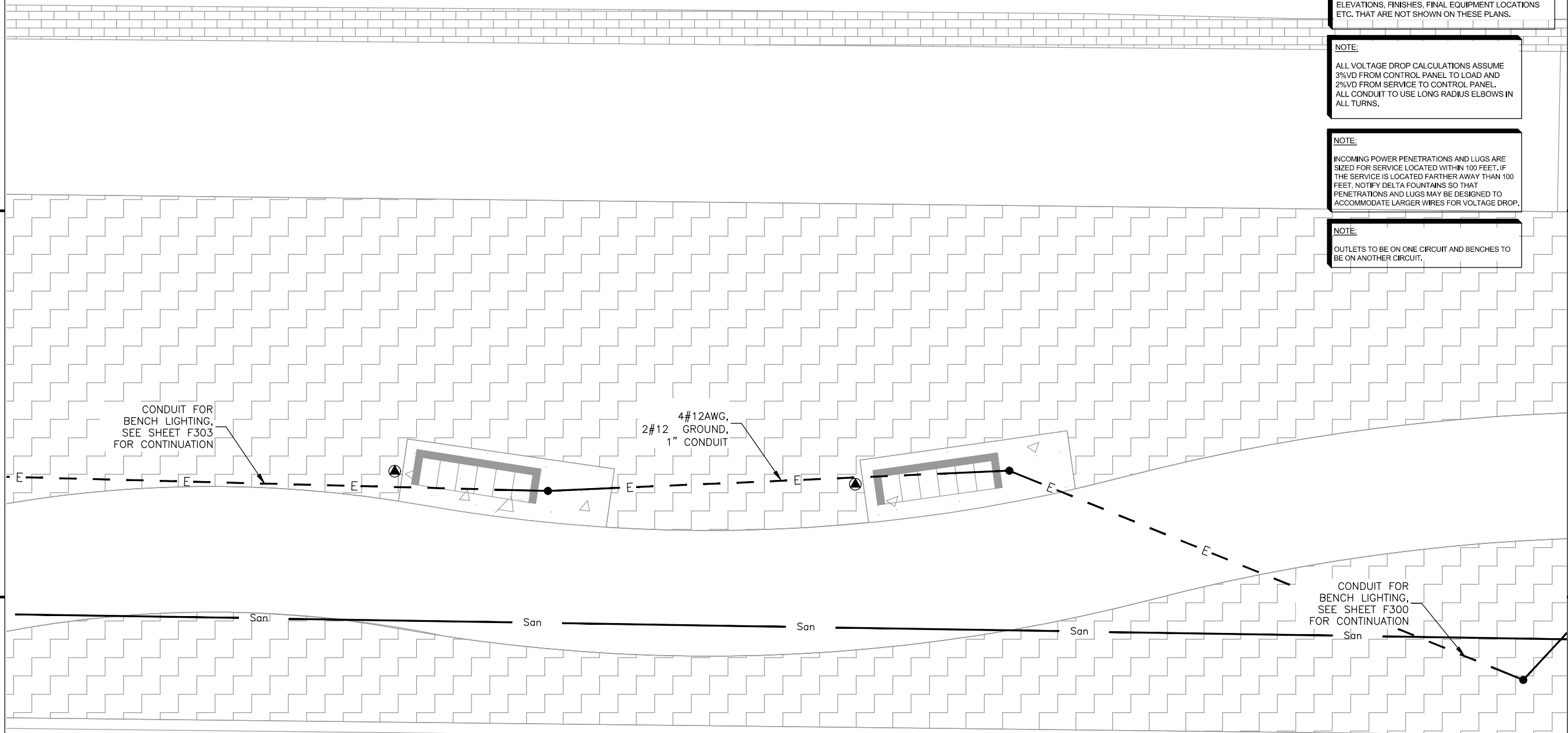
NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL VOLTAGE DROP CALCULATIONS ASSUME 3%VD FROM CONTROL PANEL TO LOAD AND 2%VD FROM SERVICE TO CONTROL PANEL. ALL CONDUIT TO USE LONG RADIUS ELBOWS IN ALL TURNS.

NOTE:
INCOMING POWER PENETRATIONS AND LUGS ARE SIZED FOR SERVICE LOCATED WITHIN 100 FEET. IF THE SERVICE IS LOCATED FARTHER AWAY THAN 100 FEET, NOTIFY DELTA FOUNTAINS SO THAT PENETRATIONS AND LUGS MAY BE DESIGNED TO ACCOMMODATE LARGER WIRES FOR VOLTAGE DROP.

NOTE:
OUTLETS TO BE ON ONE CIRCUIT AND BENCHES TO BE ON ANOTHER CIRCUIT.



FEATURE ELECTRICAL PIPING SCHEMATIC
SCALE: 3/8" = 1'-0"

DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258

V. (904) 886-9030
F. (904) 886-9089

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER:	
DATE:	03-28-19
DRAWN BY:	JWT
CHECKED BY:	DELTA
APPROVED BY:	
SCALE:	As Noted

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

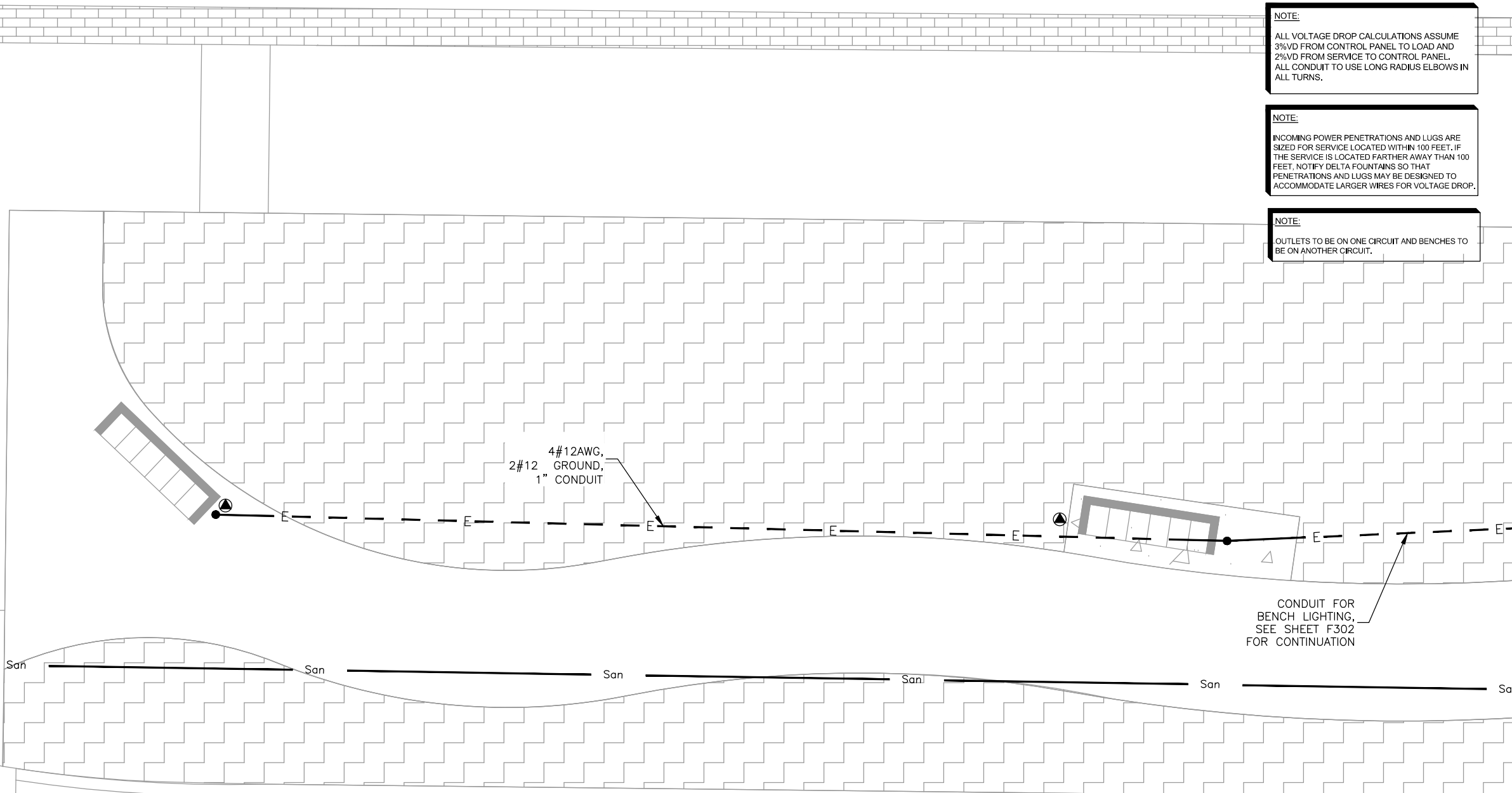
NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL VOLTAGE DROP CALCULATIONS ASSUME 3%VD FROM CONTROL PANEL TO LOAD AND 2%VD FROM SERVICE TO CONTROL PANEL. ALL CONDUIT TO USE LONG RADIUS ELBOWS IN ALL TURNS.

NOTE:
INCOMING POWER PENETRATIONS AND LUGS ARE SIZED FOR SERVICE LOCATED WITHIN 100 FEET. IF THE SERVICE IS LOCATED FARTHER AWAY THAN 100 FEET, NOTIFY DELTA FOUNTAINS SO THAT PENETRATIONS AND LUGS MAY BE DESIGNED TO ACCOMMODATE LARGER WIRES FOR VOLTAGE DROP.

NOTE:
OUTLETS TO BE ON ONE CIRCUIT AND BENCHES TO BE ON ANOTHER CIRCUIT.

R
T



FEATURE ELECTRICAL PIPING SCHEMATIC
SCALE: 3/8" = 1'-0"

DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258

V. (904) 886-9030
F. (904) 886-9089

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

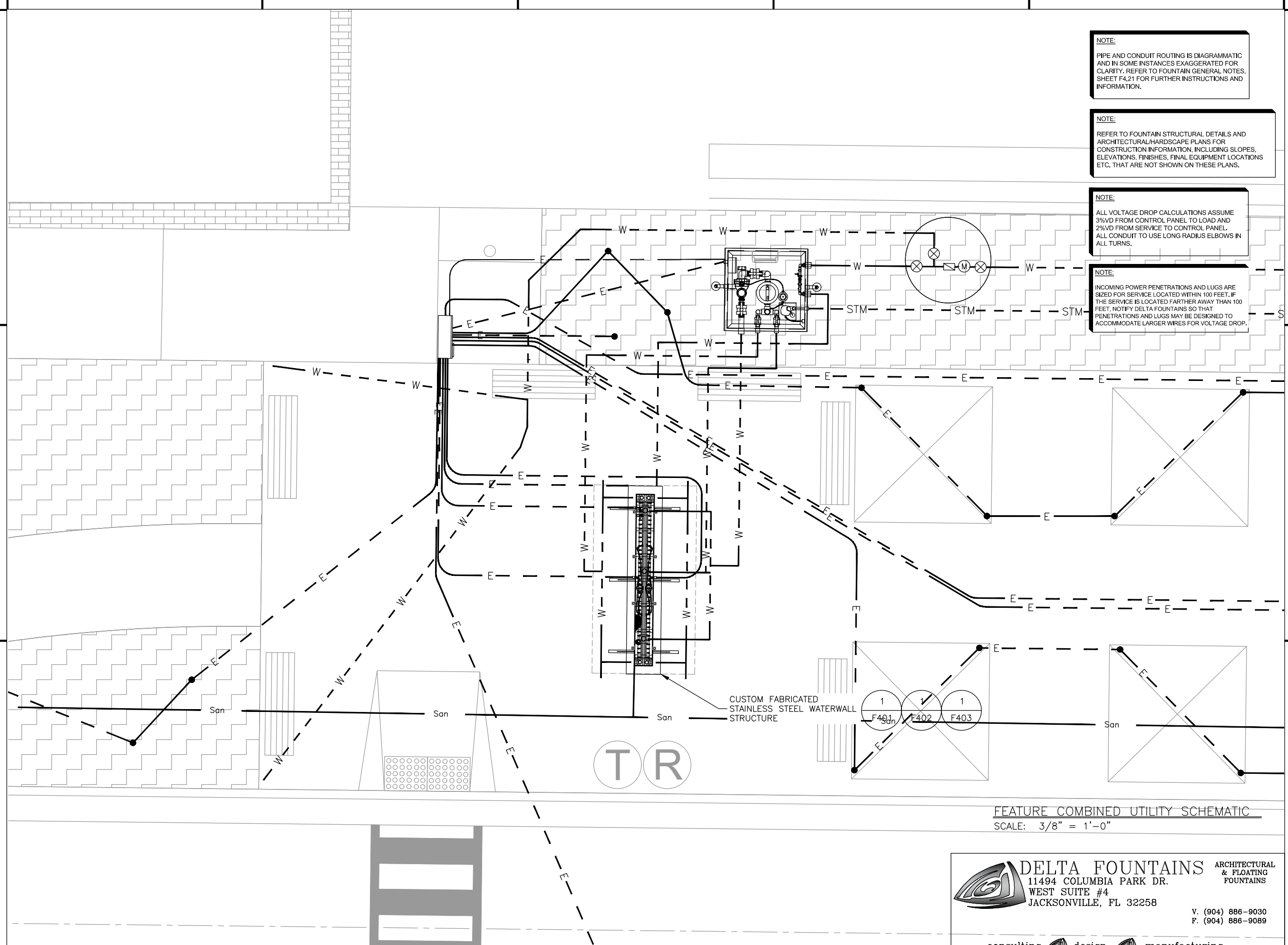
PROJECT NUMBER:	
DATE:	03-28-19
DRAWN BY:	JWT
CHECKED BY:	DELTA
APPROVED BY:	
SCALE:	As Noted

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F4.21 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL VOLTAGE DROP CALCULATIONS ASSUME 3%VD FROM CONTROL PANEL TO LOAD AND 2%VD FROM SERVICE TO CONTROL PANEL. ALL CONDUIT TO USE LONG RADIUS ELBOWS IN ALL TURNS.

NOTE:
INCOMING POWER PENETRATIONS AND LUGS ARE SIZED FOR SERVICE LOCATED WITHIN 100 FEET. IF THE SERVICE IS LOCATED FARTHER AWAY THAN 100 FEET, NOTIFY DELTA FOUNTAINS SO THAT PENETRATIONS AND LUGS MAY BE DESIGNED TO ACCOMMODATE LARGER WIRES FOR VOLTAGE DROP.



CUSTOM FABRICATED
STAINLESS STEEL WATERWALL
STRUCTURE

TR

FEATURE COMBINED UTILITY SCHEMATIC
SCALE: 3/8" = 1'-0"

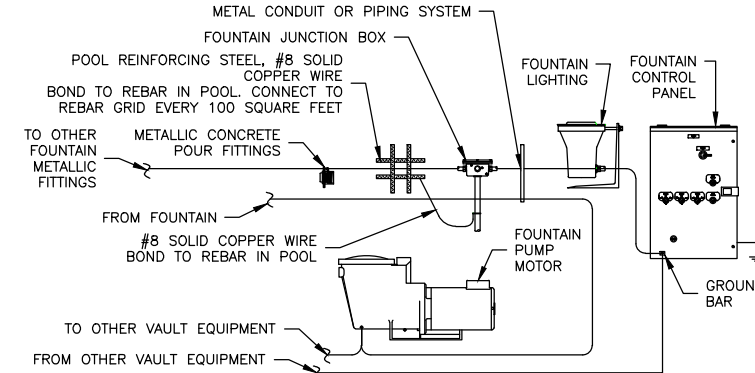
DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258
V. (904) 886-9030
F. (904) 886-9089

GENERAL ELECTRICAL NOTES:

- THE INSTALLATION OF ELECTRICAL EQUIPMENT AND WIRING IN WATER CAN PRODUCE EXTREME HAZARDS, IT IS THE RESPONSIBILITY OF THE INSTALLING ELECTRICAL CONTRACTOR TO CONSULT & COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE (NEC) PUBLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION; QUINCY, MASSACHUSETTS AND SAFETY REGULATIONS PRIOR TO INSTALLATION OF ELECTRICAL EQUIPMENT. IN THE EVENT OF CONFLICTING REQUIREMENTS BETWEEN CONTRACT DOCUMENTS AND ANY LOCAL ELECTRIC CODE OR OTHER GOVERNING ORGANIZATIONS FOR THIS LOCATION, THE MOST STRINGENT SHALL GOVERN AND TAKE PRECEDENCE. IN THIS EVENT, THE ARCHITECT SHALL BE NOTIFIED IMMEDIATELY IN WRITING OF SUCH CONFLICT.
- IT IS THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL FIELD DIMENSIONS CRITICAL TO FOUNTAIN EQUIPMENT INSTALLATION AND PERFORMANCE AND REPORT ANY DISCREPANCIES, IN WRITING, TO DELTA FOUNTAINS AND THE ENGINEER UPON IMMEDIATE NOTICE.
- IT IS THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO INSURE THAT ALL ELECTRICAL EQUIPMENT IS INSTALLED AND WIRED WHETHER IT IS CALLED OUT WITHIN THE CONTRACT DOCUMENTS OR NOT, BY A QUALIFIED LICENSED ELECTRICIAN EXPERIENCED IN FOUNTAIN SYSTEM WIRING. DELTA FOUNTAINS ASSUMES NO RESPONSIBILITY OR LIABILITY WHATSOEVER FOR INSTALLATIONS NOT CARRIED OUT BY A QUALIFIED, LICENSED, ELECTRICIAN AND IN ACCORDANCE WITH OUR SHOP DRAWINGS, AND ALL PROVISIONS OF THE LATEST EDITION OF NEC IN GENERAL, ARTICLE 680 SPECIFICALLY, AND LOCAL SAFETY REGULATIONS. ALL DELTA FOUNTAINS ELECTRICAL CONTROL PANELS INCLUDE GFCI'S WHEN AND WHERE REQUIRED, WHEN FURNISHED.
- A CLASS 'A' GROUND FAULT CIRCUIT INTERRUPTER (GFCI) MUST BE INSTALLED IN EACH BRANCH CIRCUIT SUPPLYING SUBMERSIBLE OR UNDERWATER FOUNTAIN EQUIPMENT. EQUIPMENT OPERATING AT 15 VOLTS OR LESS MUST BE PROTECTED BY SUITABLE TRANSFORMER U.L. LISTED AND MARKED FOR THE APPLICATION.
- SUBMERSIBLE/UNDERWATER LIGHTING FIXTURES MUST BE INSTALLED FOR OPERATION AT 150 VOLTS LESS BETWEEN CONDUCTORS. SUBMERSIBLE PUMPS MUST OPERATE AT 300 VOLTS OR LESS BETWEEN CONDUCTORS.
- WET/DRY LIGHTING FIXTURES MUST BE INSTALLED WITH THE TOP OF THE FIXTURE LENS BELOW THE GRATE AND MUST HAVE THE LENS ADEQUATELY GUARDED TO PREVENT CONTACT BY ANY PERSON.
- SUBMERSIBLE LIGHTING FIXTURES MUST BE INSTALLED WITH THE TOP OF THE FIXTURE LENS A MINIMUM OF 2" BELOW THE NORMAL OPERATION WATER LEVEL AND MUST HAVE THE LENS ADEQUATELY GUARDED TO PREVENT CONTACT BY ANY PERSON.
- ALL ELECTRICAL EQUIPMENT WHICH DEPENDS ON SUBMERSION FOR SAFE OPERATION MUST BE PROTECTED AGAINST OVERHEATING BY AN INDEPENDENT LOW WATER CUTOFF DEVICE IF THE WATER LEVEL DROPS BELOW NORMAL OPERATING LEVELS, OR CONTAIN AN INTERNAL THERMAL BIMETALLIC AMBIENT COMPENSATING OVERLOAD.
- MAXIMUM LENGTH OF EXPOSED CORD IN FOUNTAIN IS LIMITED TO 9'. NO ADDITIONAL CORD OR SPLICES OTHER THAN THOSE MADE IN A WATERTIGHT JUNCTION BOX, ARE TO BE MADE IN THE FOUNTAIN. CORDS EXTENDING BEYOND FOUNTAIN PERIMETER MUST BE ENCLOSED IN APPROVED WIRING ENCLOSURES.
- ALL SUBMERSIBLE LIGHTS AND PUMPS MUST HAVE SUFFICIENT CORD LENGTH TO ALLOW REMOVAL FROM THE WATER FOR RE-LAMPING AND NORMAL MAINTENANCE. FIXTURES CANNOT BE PERMANENTLY IMBEDDED IN THE FOUNTAIN STRUCTURE SO THAT THE WATER LEVEL MUST BE REDUCED OR THE FOUNTAIN DRAINED FOR RE-LAMPING, MAINTENANCE, OR INSPECTION.
- SUBMERSIBLE EQUIPMENT MUST BE INHERENTLY STABLE OR BE SECURELY FASTENED IN PLACE WITH NON-CORROSIVE FASTENERS SUITABLE FOR THE PURPOSE.
- UNDERWATER JUNCTION BOXES MUST BE FILLED WITH AN APPROVED RE-ENTERABLE ELECTRICAL POTTING COMPOUND (WAX OR PARAFFIN IS NOT ACCEPTABLE) PRIOR TO FILLING FOUNTAIN AND, AFTER ALL CIRCUITS HAVE BEEN CHECKED, TO PREVENT THE ENTRY OF MOISTURE, AND BE FIRMLY ATTACHED TO SUPPORTS OR DIRECTLY TO THE FOUNTAIN SURFACE AND BONDED AS REQUIRED. ALL CONDUIT STUBBED UP THROUGH THE FOUNTAIN FLOOR MUST BE STAINLESS STEEL, PVC, RED BRASS, AND EVERDUR ARE NOT ACCEPTABLE AS A CONDUIT SUPPORT STUB FOR SUBMERSIBLE JUNCTION BOXES. ALL CONDUIT ENTRIES MUST BE COMPLETELY SEALED PRIOR TO POTTING TO PREVENT COMPOUND FROM ENTERING CONDUIT SYSTEM. AFTER TESTING, JUNCTION BOXES SHALL BE SEALED WITH SCOTCH 3M RE-ENTERABLE COMPOUND OR OTHER APPROVED FILLING COMPOUND. CONFIRM POTTING COMPOUND HAS CURED BEFORE INSTALLING LID ON JUNCTION/DECK BOXES.
- ALL ELECTRICAL CONDUIT AND CONDUIT FITTINGS BETWEEN SUBMERSIBLE LIGHT FIXTURE NICHES, JUNCTION BOXES AND CONTROL PANELS WILL BE U.L. LISTED RIGID, NONMETALLIC, PVC NEMA, TC-2 MAX. 90°C, SUNLIGHT RESISTANT FOR ABOVE AND BELOW GROUND USE. ALL CONDUITS SHALL BE PROTECTED AT ALL TIMES FROM POSSIBLE WATER INGRESS. USE ONLY APPROVED PRIMER AND PVC GLUE SUITABLE FOR JOINING ALL PVC CONDUITS AND FITTINGS PER MANUFACTURER'S INSTRUCTIONS.
- ALL UNDERWATER JUNCTION BOXES MUST BE EQUIPPED WITH THREADED CONDUIT ENTRIES AND COMPRESSION TYPE CORD CONNECTORS FOR CORD ENTRY. STRAIN RELIEF CONNECTORS SERVING NICHE-MOUNTED UNDERWATER LIGHTS SHALL BE CAPABLE OF SEALING BOTH THE FIXTURE CORD AND AN AWG #8 BARE BONDING WIRE WHICH MAY BE REQUIRED BY SOME LOCAL CODES.
- ALL ELECTRICAL EQUIPMENT MUST BE PROPERLY BONDED AND GROUNDED FOR SAFETY, PER THE LATEST NEC AND LOCAL CODE REQUIREMENTS. ALL BONDING LUGS SHALL BE PROVIDED BY INSTALLING ELECTRICAL CONTRACTOR. INSTALLING CONTRACTOR SHALL VERIFY ALL NECESSARY REQUIREMENTS OF LOCAL INSPECTOR BEFORE INSTALLING, AND NOTIFY DELTA FOUNTAINS OF ANY REQUIRED DEVIATIONS FROM SPECIFICATIONS OR PLANS AND NOTES, AND RESOLVE ALL CONFLICTS BEFORE INSTALLING EQUIPMENT. CONTRACTOR TO INSURE THAT ALL BONDING CODES ARE COMPLIED WITH FOR EACH METAL FOUNTAIN EQUIPMENT COMPONENT.
- ALL CONDUIT CONNECTIONS BETWEEN DISSIMILAR METALS MUST BE MADE WITH DIELECTRIC FITTINGS, AND SEALED WITH DIELECTRIC THREAD COMPOUND TO PREVENT GALVANIC DEGRADATION.
- THE INSTALLING ELECTRICAL CONTRACTOR WILL VERIFY THAT ALL ELECTRICAL EQUIPMENT GROUNDS WILL HAVE THE SAME REFERENCE POTENTIAL AND WILL GIVE EVIDENCE OF SUCH TO DELTA FOUNTAINS BEFORE ANY EQUIPMENT IS INITIALLY ENERGIZED.
- THE INSTALLING CONTRACTOR SHALL SIZE ALL FEED-WIRES LEADING TO FOUNTAIN CONTROL PANEL FOR NO MORE THAN 2% VOLTAGE DROP, AND SHALL NOTIFY DELTA FOUNTAINS BEFORE THE CONTROL PANEL IS FABRICATED IF WIRE IS UPSIZED SUCH THAT EXTRA LARGE WIRE LUGS ARE REQUIRED. IT IS THE RESPONSIBILITY OF ELECTRICAL CONTRACTOR TO PROVIDE ANY DISCONNECT REQUIRED BY LOCAL CODE REQUIREMENTS.
- THE FOUNTAIN CONTROL PANEL SHALL BE ADEQUATELY PROTECTED FROM DEBRIS AND STORED PROPERLY DURING CONSTRUCTION AND PRIOR TO INITIAL OPERATION AND SHALL BE VACUUMED CLEAN AND ALL SCREWS FOR TERMINAL CONNECTIONS TIGHTENED.
- THE ELECTRICAL CONTRACTOR SHALL ENSURE THAT SUPPLY VOLTAGE IS WITHIN 5% OF DESIGN VOLTAGE WHEN ALL EQUIPMENT IS IN OPERATION AND SHALL RE-TAP TRANSFORMER, UP SIZE WIRE, OR SUPPLY A BUCK AND BOOST TRANSFORMER TO GET SUPPLY VOLTAGE TO NECESSARY LEVEL, IF NECESSARY.
- ANY AND ALL COSTS ASSOCIATED WITH THE ABOVE ARE THE RESPONSIBILITY OF INSTALLING CONTRACTOR.
- CONDUITS ENTERING FOUNTAIN SYSTEM CONTROL PANELS SHALL BE INSTALLED INTO BOTTOM OF ENCLOSURE IN THE EVENT WATER ENTERS CONDUIT AND FLOWS INTO PANEL THROUGH CONDUIT OPENINGS. A DRAIN OPENING MUST BE MADE IN BOTTOM OF ENCLOSURE PAN TO ALLOW DRAINAGE OF WATER FROM ENCLOSURE IN THE EVENT OF WATER INGRESS. DO NOT MOUNT CONTROL PANEL WHERE IRRIGATION NOZZLES WILL SPRAY DIRECTLY AT PANEL.
- PULL CORRECT QUANTITY AND SIZE WIRES WITH SEPARATE GROUND THROUGH CONDUIT INTO JUNCTION BOX. MAKE ALL SPLICES AND CONNECTIONS TIGHT AND WELL INSULATED. CONNECT GROUND WIRE TO GROUND LUGS IN JUNCTION BOX. ALL WIRING AND CONDUIT SHALL BE SIZED BY THE ELECTRICAL CONTRACTOR IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC AND ALL ELECTRICAL CODES AND REGULATIONS. WHERE WIRED CONDUIT SIZES ARE SPECIFIED ON THE DRAWINGS, THEY SHALL BE INTERPRETED AS MINIMUM ALLOWABLE SIZES. ALL CONDUCTORS SHALL BE COPPER WITH INSULATION SUITABLE FOR THE PARTICULAR WIRING LOCATION. MINIMUM ACCEPTABLE INSULATION TYPE IS THWN OR BETTER, SUITABLE FOR BOTH DRY AND WET LOCATIONS. CONDUCTOR INSULATION SHALL BE MOISTURE RESISTANT, FLAME RETARDANT THERMOPLASTIC AS APPROVED BY THE NEC. CONDUCTOR SIZING SHALL BE BASED ON AN AMBIENT TEMPERATURE OF 30 DEGREES CELSIUS AND A CONDUCTOR TEMPERATURE RATING OF 75 DEGREES CELSIUS MAX. PER ARTICLE 310 OF THE NEC. ALL UNDERWATER ELECTRICAL CABLE SHALL EITHER BE ENCASED IN WATERPROOF, SEALED PVC CONDUIT OR SHALL BE RATED FOR CONTINUOUS OPERATION IN UNDERWATER, MARINE ENVIRONMENTS.
- INSERT EACH SUBMERSIBLE CORD THROUGH THE BRASS CORD SEALS PROVIDED ON THE JUNCTION BOX, AND TIGHTEN COMPLETELY.
- DO NOT OPERATE SUBMERSIBLE LIGHTS OR PUMPS MORE THAN 10 SECONDS UNLESS COMPLETELY SUBMERGED OR DAMAGE WILL RESULT AND WARRANTIES WILL BE VOIDED.
- ALL CONDUCTORS FOR FEEDERS WHICH EXCEED 200 FEET IN LENGTH SHALL BE INCREASED 1 TRADE SIZE AND INCREASED AN ADDITIONAL 1 TRADE SIZE FOR EACH ADDITIONAL 100 FEET OF FEEDER CABLE LENGTH.
- THE INFORMATION SUPPLIED IN THESE DRAWINGS SPECIFIES THE GENERAL REQUIREMENTS OF A COMPLETE FUNCTIONING ELECTRICAL POWER DISTRIBUTION AND CONTROL SYSTEM. THE ELECTRICAL SUBCONTRACTOR SHALL COORDINATE ALL ELECTRICAL INSTALLATION ACTIVITIES WITH THE CONSTRUCTION MANAGER, GENERAL CONTRACTOR, ARCHITECT AND (WITH RESPECT TO WORK PHASE) OTHER SEPARATE CONTRACTORS PERFORMING WORK RELATED TO THE FOUNTAIN INSTALLATION.
- ALL CONDUCTORS SHALL BE RUN IN RIGID CONDUIT SIZED FOR THE NUMBER OF WIRES CONTAINED WITHIN PER NEC REQUIREMENTS. RIGID CONDUIT SHALL BE CORROSION RESISTANT AND EITHER GALVANIZED STEEL OR RIGID PVC. WHEN CONDUIT IS SUBMERGED OR IN OTHER WET LOCATIONS, RIGID PVC SHALL BE REQUIRED. CONDUCTOR SIZING SHALL BE CORRECTED FOR THE NUMBER OF WIRES TO BE RUN IN A SINGLE CONDUIT OR RACEWAY IN ACCORDANCE WITH THE NEC. ALL CONDUIT LOCATIONS AND ROUTING SHALL BE APPROVED BY THE ARCHITECT BEFORE INSTALLATION.
- THE WORK TO COMPLETE THE INSTALLATION OF THE FOUNTAIN INCLUDES SUCH NECESSARY MATERIAL AND DEVICES OF A MINOR NATURE THAT MAY NOT BE INDICATED ON THE DRAWINGS OR MENTIONED IN THE SPECIFICATIONS, BUT WHICH ARE NECESSARY FOR THE COMPLIANCE WITH CODES AND FOR THE SUCCESSFUL OPERATION OF THE FEATURE. THE CONTRACTOR SHALL BE ALLOWED NO EXTRA COMPENSATION BECAUSE OF THIS REQUIREMENT.
- THOROUGHLY TEST ALL FIXTURES, SERVICES AND ALL CIRCUITS FOR PROPER OPERATING CONDITIONS AND FREEDOM FROM GROUNDS AND SHORT CIRCUITS BEFORE ACCEPTANCE IS REQUESTED. ALL EQUIPMENT, APPLIANCES AND DEVICES SHALL BE OPERATED UNDER LOAD CONDITIONS.
- THERMAL OVERLOAD RELAYS SHALL BE SET AT NOT MORE THAN 115% OF MOTOR FULL LOAD CURRENT AND/OR IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
- ALL CONNECTIONS MUST BE RECHECKED BEFORE START UP AND ONE MONTH AFTER STARTUP BY A QUALIFIED TECHNICIAN.
- ALL G.F.C.I. PROTECTED CIRCUITS MUST HAVE A SEPARATE NEUTRAL.
- ALL G.F.C.I. BREAKERS HAVE PIGTAILS WIRED TO THE NEUTRAL BAR.
- CONTRACTOR TO ENSURE THAT ALL BONDING CODES ARE COMPLIED WITH FOR EACH METAL FOUNTAIN EQUIPMENT COMPONENT.
- WIRES FOR WATER LEVEL SENSOR MUST BE RUN IN A SEPARATE CONDUIT FROM THE FOUNTAIN TO THE CONTROL PANEL.
- ALL CONDUIT PENETRATIONS THROUGH STRUCTURE WALLS INTO OPEN AREAS BELOW FOUNTAIN STRUCTURE MUST HAVE ALLOWANCES MADE FOR SETTLEMENT.

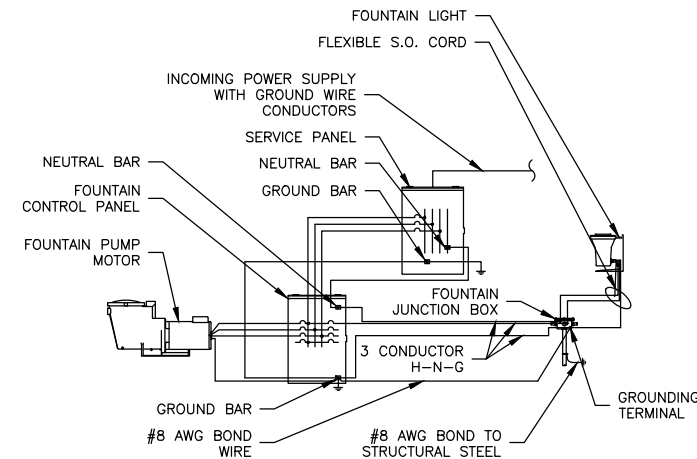
- ALL CONDUIT INSTALLATION IN TRADE AREAS BELOW THE FOUNTAINS SHALL BE INSTALLED WITH E.M.T. AND IN THE LEVEL BELOW AND WITH E.M.T. STRAPS PER N.E.C. AND SPECIFICATIONS.
- FLOOR MOUNTED CONTROL CENTERS AND TRANSFORMERS FOR FOUNTAIN RELATED EQUIPMENT SHALL BE INSTALLED ON A 4" CONCRETE HOUSEKEEPING PAD IF INSTALLED IN AN EQUIPMENT ROOM OR A PVC HOUSEKEEPING PAD IF INSTALLED IN A FIBERGLASS EQUIPMENT ROOM.
- CONTRACTOR INSTALLING FOUNTAIN MANUFACTURER SUPPLIED DECK BOXES IN CONCRETE FOR FOUNTAIN NICHE LIGHTING IS TO ENSURE THAT ALL OPEN CONDUIT PORTS ARE PLUGGED AND ARE WATERTIGHT PRIOR TO SLAB POUR AROUND DECK BOXES.
- ALL PENETRATIONS THROUGH OUTSIDE WALLS TO BELOW GRADE SHALL BE SEALED PER BUILDING SPECIFICATIONS. USING "EASY-LINK SEALS" IS RECOMMENDED.
- ALL CONNECTIONS IN THE FOUNTAIN SHALL BE MADE WITH THE ASSISTANCE OF A PLUMBER, USING TEFLON TAPE OR TEFLON PASTE TO ELIMINATE ALL LEAKS. USE ONLY TAPERED (N.P.T.) BRASS OR STAINLESS STEEL FITTINGS OR NIPPLES. THE USE OF GALVANIZED, PVC OR BLACK STEEL IS UNACCEPTABLE.
- CONDUITS ARE DRAWN FOR CLARITY AND DO NOT NECESSARILY SHOW EXACT ROUTING. CONTRACTOR SHALL INSTALL CONDUITS IN COMPLIANCE WITH NEC CODE, WHICH THERE SHALL BE NO MORE THAN THE EQUIVALENT OF FOUR QUARTER BENDS (360 DEGREES TOTAL) BETWEEN PULL POINTS, E.G., CONDUIT BODIES AND BOXES.
- CONTRACTOR SHALL OBTAIN ALL NECESSARY INSTALLATION PERMITS AND INSPECTIONS.
- ALL COMPONENT ITEMS USED IN THE PRODUCTION OF DELTA FOUNTAINS' PRODUCTS ARE U.L. LISTED WHENEVER SUCH LABELING IS AVAILABLE FROM THE SOURCE EQUIPMENT OR MATERIAL.
- SHOULD ANY PRODUCT REQUIRE A 'THIRD PARTY' LABEL OR CERTIFICATION AS AN ASSEMBLY (E.G., N.E.C., U.L. OR E.T.L. LISTING) SUCH REQUIREMENTS SHALL BE DETERMINED, CONTRACTED FOR, AND PAID BY OTHERS.
- DELTA FOUNTAINS SHALL NOT BE RESPONSIBLE OR LIABLE IN ANY MANNER WHATSOEVER FOR SPECIAL LABELING OR CERTIFICATION REQUIREMENTS, INCLUDING THIRD PARTY PRODUCT TESTING UNLESS SPECIFICALLY INCLUDED IN ITS PROPOSALS, QUOTATIONS, DRAWING DESCRIPTIONS AND DETAILS, REGARDLESS OF PROJECT SPECIFICATION OR CODE REQUIREMENTS.

- ALL METAL PARTS WITHIN 5 FEET OF THE INSIDE WALLS OF FOUNTAIN AND ALL METAL PARTS OF ASSOCIATED ELECTRICAL EQUIPMENT MUST BE BONDED TOGETHER PER NEC 680.
- ALL BONDING CONDUCTORS SHALL BE BARE #8 SOLID COPPER.
- ALL BONDING SHALL BE CONTINUOUS WITHOUT SPLICES. ALL CONNECTIONS SHALL BE MADE BY EXOTHERMIC WELD OR FITTING APPROVED FOR SUCH USE IN FOUNTAINS AND POOLS.
- IF EXPOXY COATED REBAR IS SPECIFIED THE CONTRACTOR MUST USE A #8 SOLID COPPER WIRE GRID FOR BONDING IN THE CONCRETE OF ALL AREAS CONTAINING WATER OR COMING IN CONTACT WITH WATER IN THE FOUNTAIN. CONTRACTOR TO CONFORM TO NEC AND LOCAL JURISDICTIONAL CODE REQUIREMENTS FOR THE BONDING.



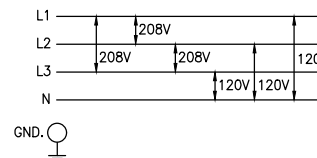
1 TYPICAL FOUNTAIN "BONDING" SCHEMATIC
F300 NTS

- ALL METAL PARTS WITHIN 5 FEET OF THE INSIDE WALLS OF FOUNTAIN AND ALL METAL PARTS OF ASSOCIATED ELECTRICAL EQUIPMENT MUST BE BONDED TOGETHER PER NEC 680 (SEE BONDING SCHEMATIC ABOVE).



2 TYPICAL FOUNTAIN "GROUNDING" SCHEMATIC
F300 NTS

CONTROL SYSTEM POWER REQUIREMENT:
120/208 VOLT, THREE PHASE, 4-WIRE + GND.



*REFER TO NFPA 70 (NEC) ARTICLE 250

3 ELECTRICAL POWER SUPPLY OPTIONS
F300 NTS

SERVICE OCPD RATING	VAULT PENETRATION SIZE
60A	1 1/2"
100A	2"
200A	3"
300A	4"

INCOMING VAULT PENETRATION SIZE:
THE PENETRATION SIZES ARE BASED ON COPPER WIRE. IF SERVICE CONDUCTOR SIZE IS INCREASED DUE TO VOLTAGE DROP OR ALUMINUM WIRE, DELTA FOUNTAINS MUST BE NOTIFIED BEFORE PRODUCTION IN ORDER TO ACCOMMODATE THE INCREASED PENETRATION SIZE

GRAEF

1150 Springhurst Drive,
Suite 201
Green Bay, WI 54304-5947
920 / 592 9440
920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND
UTILITY RELAY

400 James Street
De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

PROJECT NUMBER:
DATE: 03-28-19
DRAWN BY: JWT
CHECKED BY: DELTA
APPROVED BY:
SCALE: As Noted

SHEET TITLE:

POWER SUPPLY &
BONDING DETAILS

SHEET NUMBER:

F310

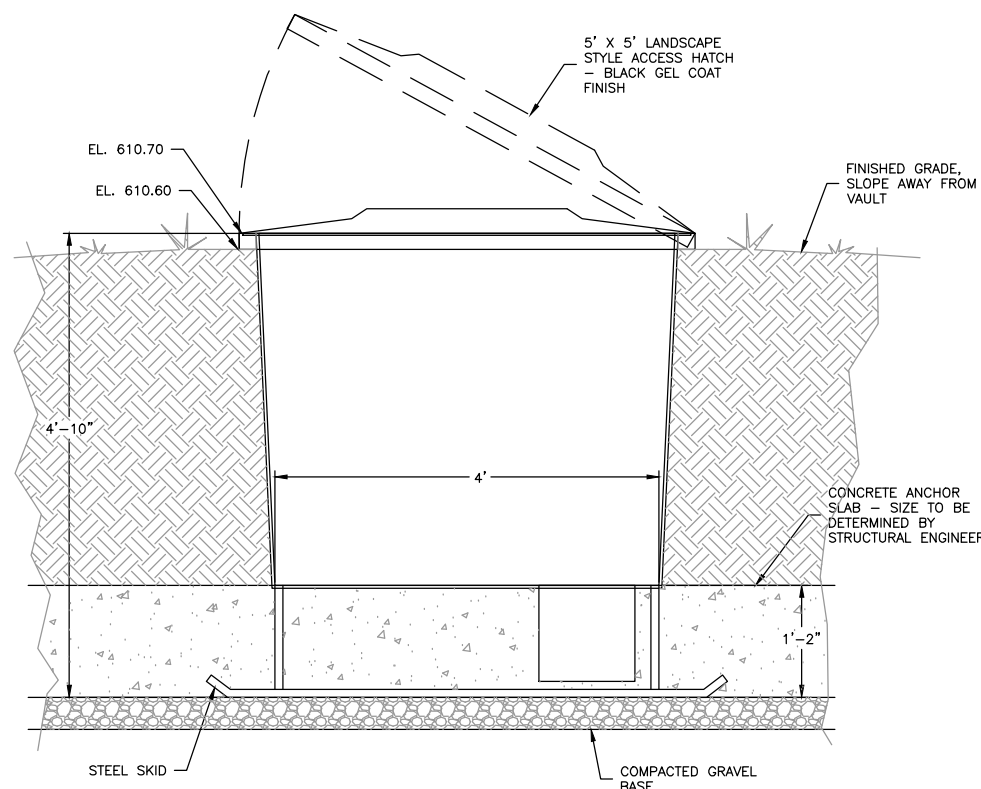
DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258
V. (904) 886-9030
F. (904) 886-9089
consulting design manufacturing

PUMP SCHEDULE										
TAG	FEATURE	MODEL NO.	MANUFACTURER	HP	VOLTAGE	Ø	RPM	GPM	'T.D.H.	F.L.A.
P-#	FEATURE	SPECK	72VI	3	208 V.	3	3450	120	60'	11.0
P-#	EQUIPMENT VAULT SUMP PUMP	SP33-VF	BARNES	1/3	120 V.	1	3450	20	12'	5.8

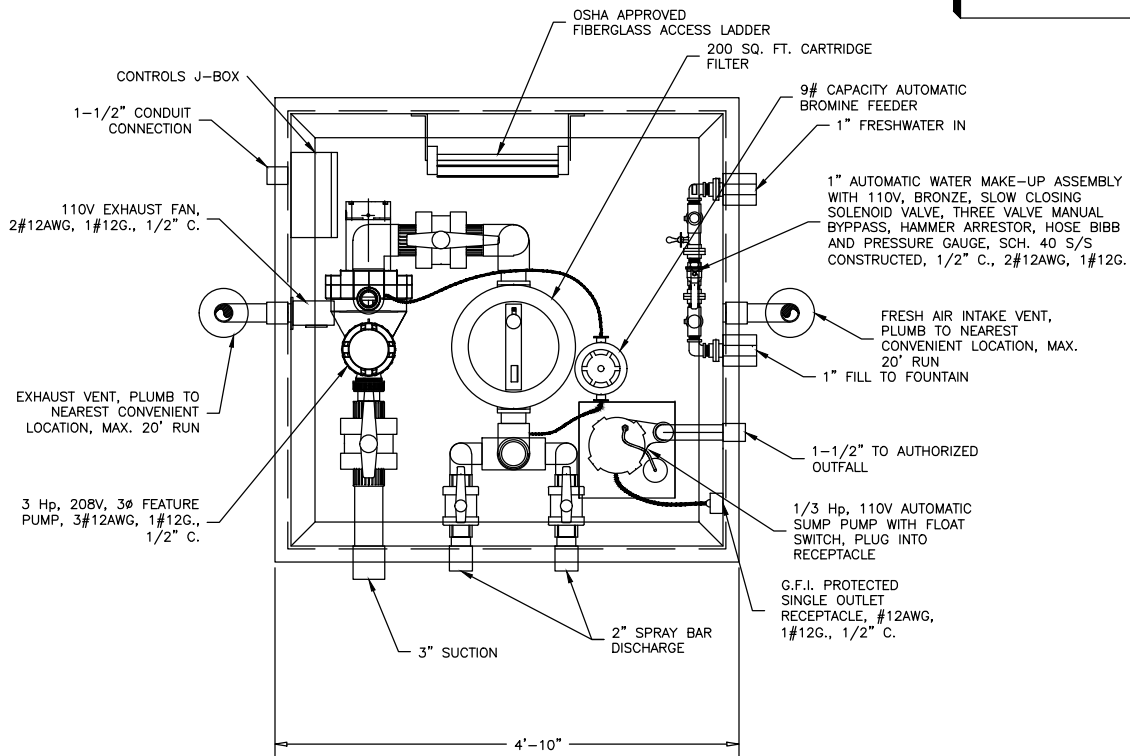
NOTE:
ALL STAINLESS STEEL FABRICATION SHALL BE:
- TYPE 304, 3/16" PLATE
- TYPE 304, SCH 40 THREADED PIPE
- TYPE 304, SCH 10 WELDED PIPE
- TOLERANCE +/- 1/8"
UNLESS OTHERWISE NOTED.

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC
AND IN SOME INSTANCES EXAGGERATED FOR
CLARITY. REFER TO FOUNTAIN GENERAL NOTES,
SHEET F420 FOR FURTHER INSTRUCTIONS AND
INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND
ARCHITECTURAL/HARDSCAPE PLANS FOR
CONSTRUCTION INFORMATION, INCLUDING SLOPES,
ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS
ETC. THAT ARE NOT SHOWN ON THESE PLANS.



1 DFLP-2500, 5' X 5' LOW PROFILE EQUIPMENT VAULT - ELEVATION DETAIL
SCALE: 1" = 1'-0"

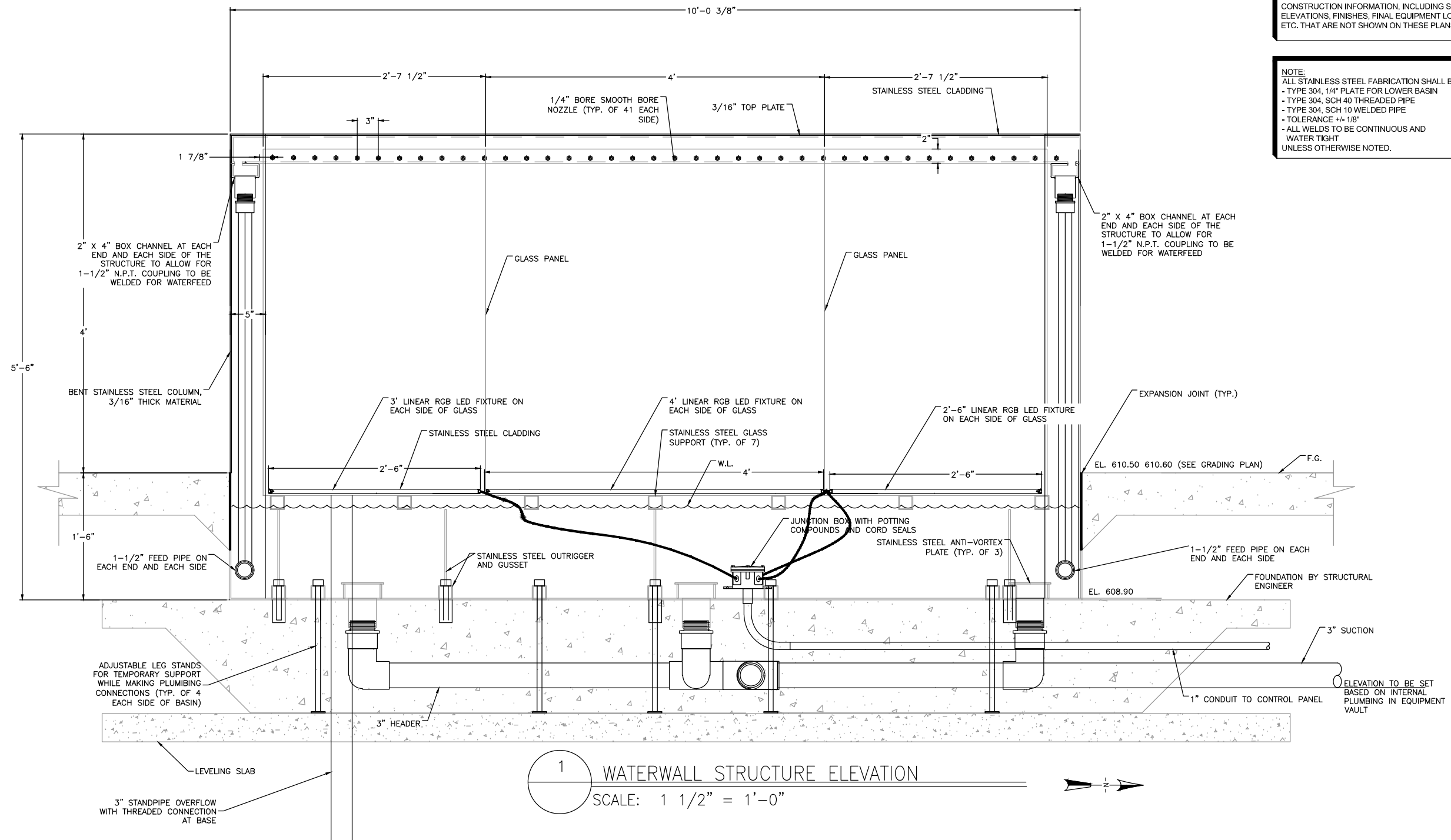


2 DFLP-2500, 5' X 5' LOW PROFILE EQUIPMENT VAULT - PLAN VIEW DETAIL
SCALE: 1" = 1'-0"

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

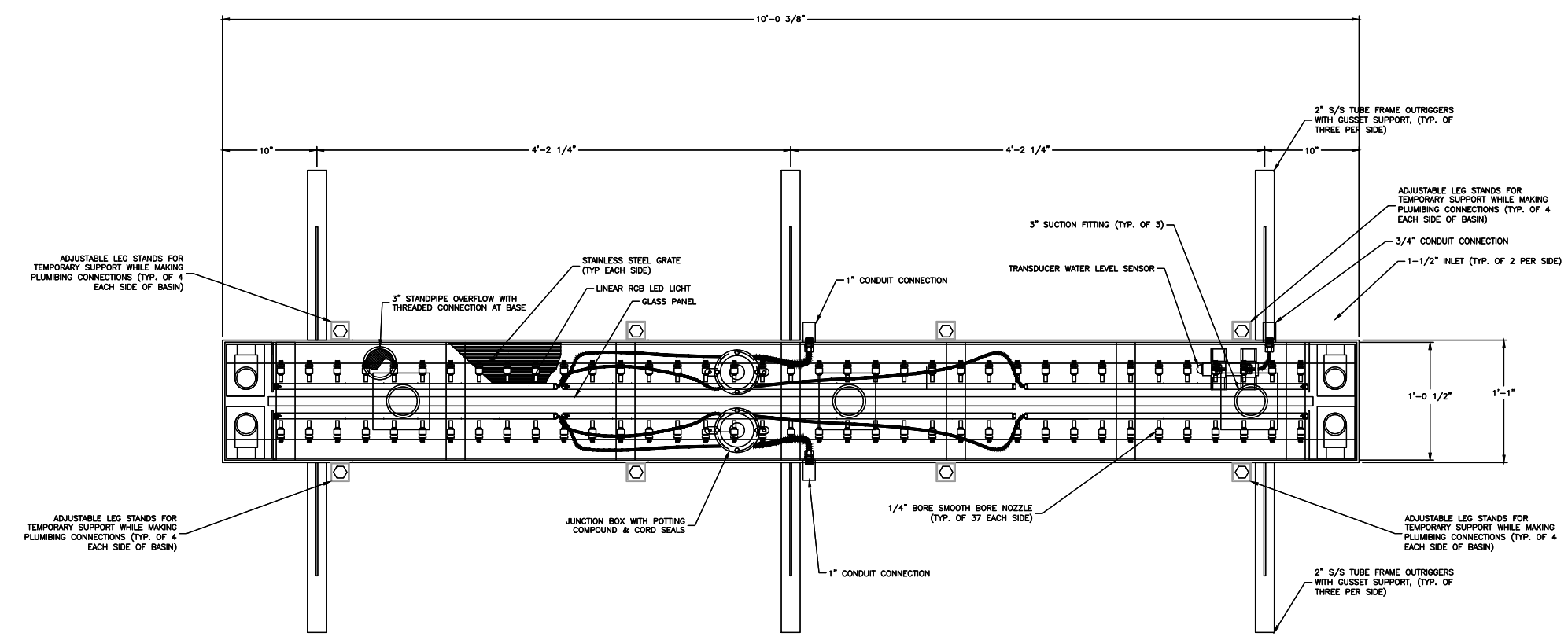
NOTE:
ALL STAINLESS STEEL FABRICATION SHALL BE:
- TYPE 304, 1/4" PLATE FOR LOWER BASIN
- TYPE 304, SCH 40 THREADED PIPE
- TYPE 304, SCH 10 WELDED PIPE
- TOLERANCE +/- 1/8"
- ALL WELDS TO BE CONTINUOUS AND WATER TIGHT UNLESS OTHERWISE NOTED.



NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL STAINLESS STEEL FABRICATION SHALL BE:
- TYPE 304, 1/4" PLATE FOR LOWER BASIN
- TYPE 304, SCH 40 THREADED PIPE
- TYPE 304, SCH 10 WELDED PIPE
- TOLERANCE $\pm 1/8"$
- ALL WELDS TO BE CONTINUOUS AND WATER TIGHT UNLESS OTHERWISE NOTED.



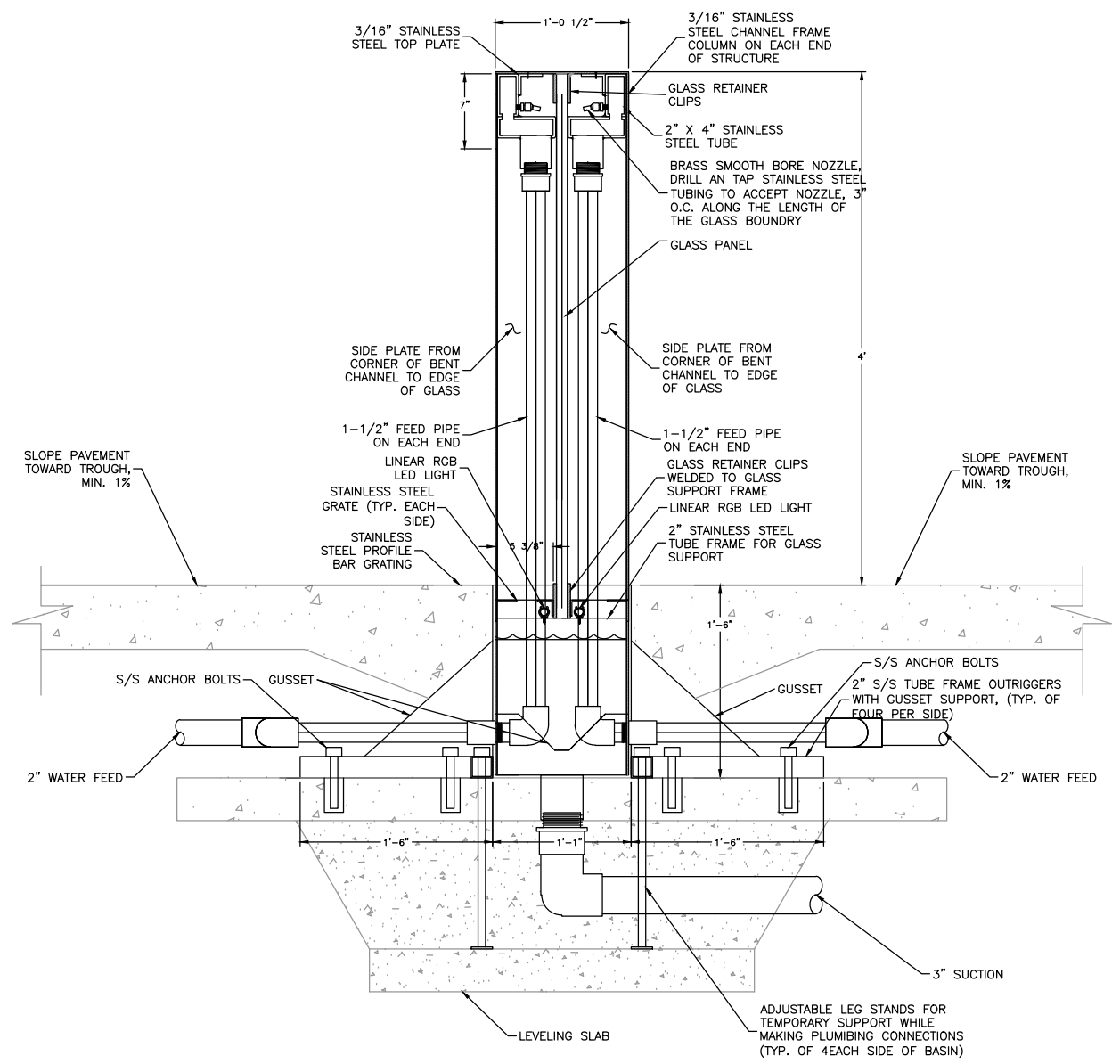
1 WATERWALL STRUCTURE PLAN VIEW
SCALE: 1 1/2" = 1'-0"

DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS
11494 COLUMBIA PARK DR.
WEST SUITE #4
JACKSONVILLE, FL 32258
V. (904) 886-9030
F. (904) 886-9089

consulting design manufacturing

NO.	DATE	REVISIONS	BY
	2/4/2020	CITY OF DE PERE MODIFICATIONS	

PROJECT NUMBER:	
DATE:	03-28-19
DRAWN BY:	JWT
CHECKED BY:	DELTA
APPROVED BY:	
SCALE:	As Noted

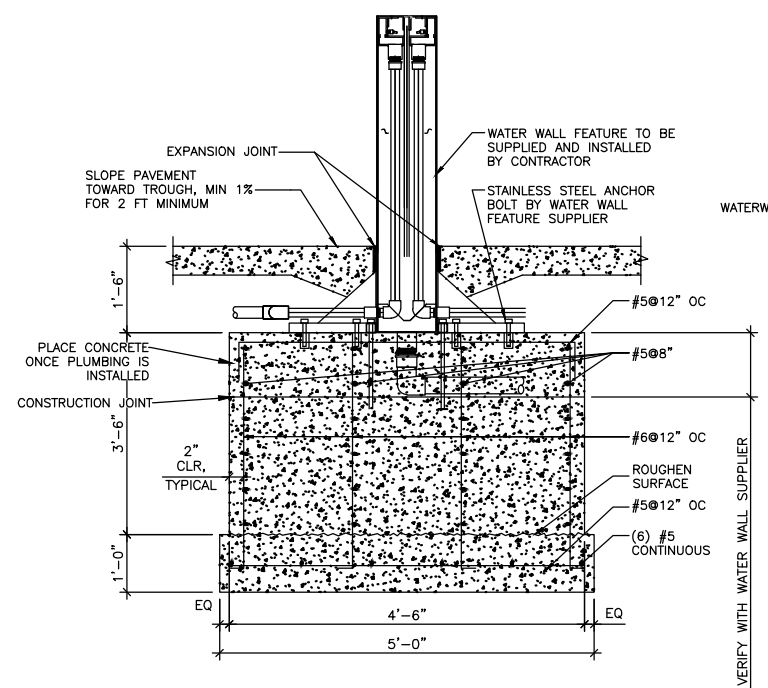
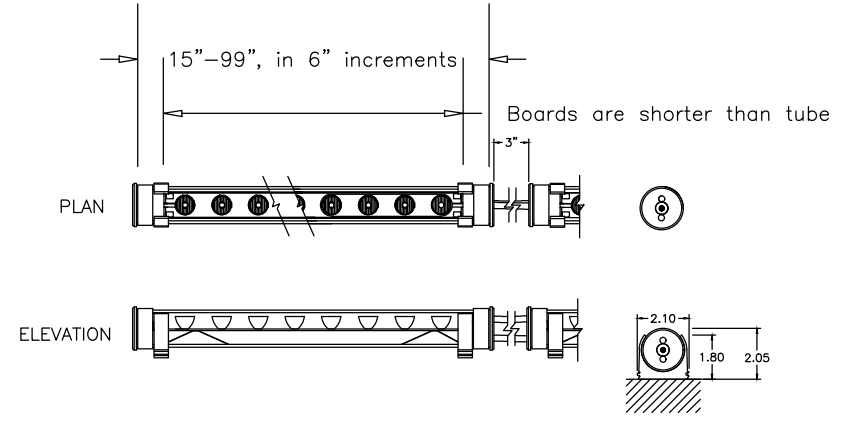


1 WATERWALL STRUCTURE SECTION
SCALE: 1 1/2" = 1'-0"

NOTE:
PIPE AND CONDUIT ROUTING IS DIAGRAMMATIC AND IN SOME INSTANCES EXAGGERATED FOR CLARITY. REFER TO FOUNTAIN GENERAL NOTES, SHEET F420 FOR FURTHER INSTRUCTIONS AND INFORMATION.

NOTE:
REFER TO FOUNTAIN STRUCTURAL DETAILS AND ARCHITECTURAL/HARDSCAPE PLANS FOR CONSTRUCTION INFORMATION, INCLUDING SLOPES, ELEVATIONS, FINISHES, FINAL EQUIPMENT LOCATIONS ETC. THAT ARE NOT SHOWN ON THESE PLANS.

NOTE:
ALL STAINLESS STEEL FABRICATION SHALL BE:
- TYPE 304, 1/4" PLATE FOR LOWER BASIN
- TYPE 304, SCH 40 THREADED PIPE
- TYPE 304, SCH 10 WELDED PIPE
- TOLERANCE +/- 1/8"
- ALL WELDS TO BE CONTINUOUS AND WATER TIGHT UNLESS OTHERWISE NOTED.



2 WATER WALL FOUNDATION DETAIL

EQUIPMENT VAULT INSTALLATION INSTRUCTIONS:

1. RECEIVING THE VAULT

- A. UPON ARRIVAL OF THE VAULT, THE RECEIVING AGENT SHOULD INSPECT THE INTERIOR AND EXTERIOR FOR ANY VISIBLE DAMAGE...
B. CONTRACTOR SHALL STORE ALL COMPONENTS IN THEIR ORIGINAL PACKAGES AND PROTECT ALL ITEMS FROM DAMAGE UNTIL FINAL PLACEMENT OCCURS.

2. EXCAVATION

- A. CHECK VAULT TO PROPER DEPTH TO RECEIVE THE VAULT AND A MINIMUM CLEAR AREA OF 3'-0" AROUND THE PERIMETER OF THE VAULT.
B. FIELD VERIFY EQUIPMENT DIMENSIONS AND REPORT ANY DISCREPANCIES IN WRITING TO DELTA FOUNTAINS.

3. INSTALLING THE VAULT

- A. ALL OF THE FOLLOWING SHALL BE COMPLETED WITHOUT FAIL ON THE SAME DAY THE PUMP VAULT IS LOWERED DOWN INTO THE DESIGNATED SPACE.
B. CHECK FOR FAVORABLE AND DRY METEOROLOGICAL FORECAST PRIOR TO BEGINNING INSTALLATION OF PUMP VAULT.

WARNING

FLOODING OF THE VAULT THRU THE NEGLIGENCE OF THE CONTRACTOR TO ADHERE TO THESE INSTALLATION SPECIFICATIONS VOIDS THE WARRANTY ON ALL EQUIPMENT IN THE VAULT.

4. CONCRETE ANCHOR SLAB

- A. POUR 4" - 6" CONCRETE LEVELING SLAB OR USE 4" COMPACTED GRAVEL BASE. STAINLESS STEEL ANCHOR BOLTS SHOULD BE INSERTED IN THE LEVELING SLAB.
B. LEVELING SLAB/COMPACTED GRAVEL SHOULD BE SLOPED SLIGHTLY TO THE CORNER OF THE VAULT WHERE THE SUMP PUMP/GRAVITY DRAIN SUMP IS LOCATED.

5. PIPING AND CONDUIT CONNECTIONS

- A. CONNECT ALL PIPING AND CONDUIT AS INDICATED ON THE CONSTRUCTION DOCUMENTS. DO NOT EXTERNALLY LOAD THE VAULT CONNECTIONS OR ALLOW THE CONNECTIONS TO SUPPORT THE WEIGHT OF THE CONNECTED PIPING.
B. ALL OPEN CONDUITS CONNECTED TO THE VAULT SHOULD BE SEALED OR PLUGGED TO PREVENT WATER INTRUSION.

WARNING

IF ALL DISCHARGE/SUCTION PIPING, ELECTRICAL CONDUIT CONNECTIONS AND AIR VENTS ARE NOT ROUTED ABOVE GRADE AND CAPPED, FLOODING WILL OCCUR DURING ADVERSE WEATHER CONDITIONS.

6. PRESSURE TESTING

- A. PRESSURE TEST ALL PIPING CONNECTED TO THE VAULT TO ENSURE THERE ARE NO LEAKS IN THE SYSTEM. REFER TO THE FOUNTAIN EQUIPMENT SPECIFICATIONS FOR PRESSURE TESTING PROCEDURES OR INSTRUCTIONS BELOW.

7. INTAKE AND EXHAUST VENTS

- A. INSTALL AIR INTAKE AND EXHAUST VENTS AS SUPPLIED AND IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS. THE VENT CAPS AS PROVIDED SHOULD BE INSTALLED IMMEDIATELY TO PREVENT WATER INTRUSION.

8. BACKFILLING AND COMPACTION

- A. PROVIDE ADEQUATE INTERIOR BRACING DURING BACKFILLING TO PREVENT DAMAGE TO THE FIBERGLASS SHELL.
B. ALL OPEN PIPING AND CONDUIT SHOULD BE PROTECTED DURING THE BACKFILL PROCESS. BACKFILL MATERIAL TO BE #57 CRUSHED STONE OR ROUNDED GRAVEL, 3/4" MAX. AND LESS THAN 5% FINES.

WARNING

DO NOT USE SAND, CLAY OR DIRT FOR BACKFILL. GUARD THE VAULT AT ALL TIMES AGAINST CROSSING BY ANY HEAVY MACHINERY OR CONCRETE TRUCKS.

PRESSURE TESTING

- 1. PERFORM TESTS IN THE PRESENCE OF THE OWNER, ARCHITECT, OR AUTHORIZED REPRESENTATIVE FOR DESIGNATED DURATION WITH NO PRESSURE LOSS OR NOTICEABLE LEAKS.
2. DO NOT INCLUDE EQUIPMENT IN TESTS WHICH COULD BE DAMAGED BY HIGH PRESSURE.

PVC INSTALLATION NOTES

- 1. UNLESS ARCHITECTS SPECIFICATIONS INDICATE OTHERWISE, THE SUGGESTED MINIMUM PIPING AND FITTING STANDARD RECOMMENDED FOR THIS INSTALLATION IS TYPE 1. PVC TYPE 1 CELL CLASSIFICATION 12454, CONFORMING TO ASTM STANDARD 1784.
2. USE ONLY PURPLE PVC PRIMER MEETING NSF, UPC, AND ASTM #F-856 STANDARDS FOR SOFTENING AND PREPARING FIELD PIPE AND FITTING SURFACES FOR SOLVENT CEMENTING (IPS CORPORATION "WELD-ON" TYPE P-70 OR EQUIVALENT).

GENERAL NOTES

- 1. FINAL NOZZLE INSTALLATION AND ADJUSTMENT FOR POSITIONING AND THROTTLING TO ACHIEVED SPECIFIED PERFORMANCES FOR ALL DISPLAY DISCHARGE POINTS TO BE PERFORMED BY INSTALLING CONTRACTOR.
2. THE EQUIPMENT VAULT LOCATION IS SHOWN IN GENERAL VICINITY ONLY. VERIFY WITH THE ARCHITECTURAL DRAWINGS FOR THE EXACT LOCATION OF THE EQUIPMENT VAULT AND PROPER ELEVATION.

GENERAL PIPING NOTES

- 1. IT IS THE INSTALLING CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL FIELD DIMENSIONS CRITICAL TO FOUNTAIN EQUIPMENT INSTALLATION AND PERFORMANCE AND REPORT ANY DISCREPANCIES IN WRITING TO DELTA FOUNTAINS AND THE ARCHITECT UPON DISCOVERY.
2. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO CHECK AND COMPLY WITH ALL APPLICABLE NATIONAL AND LOCAL PLUMBING CODES PRIOR TO INSTALLATION OF EQUIPMENT.



1150 Springhurst Drive, Suite 201 Green Bay, WI 54304-5947 920 / 592 9440 920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND UTILITY RELAY

400 James Street De Pere, WI 54115

NO. DATE REVISIONS BY 2/4/2020 CITY OF DE PERE MODIFICATIONS

PROJECT INFORMATION:

PROJECT NUMBER:

DATE: 03-28-19

DRAWN BY: JWT

CHECKED BY: DELTA

APPROVED BY:

SCALE: As Noted

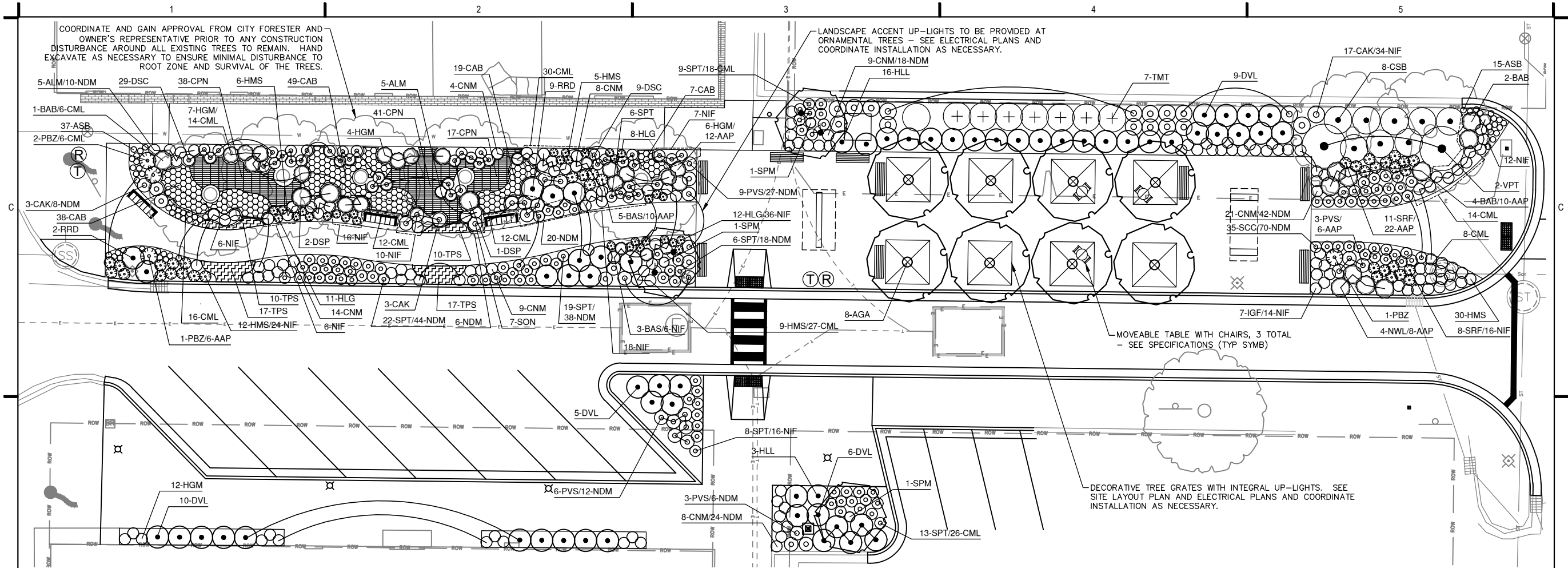
SHEET TITLE:

NOTES

SHEET NUMBER:

F420

DELTA FOUNTAINS ARCHITECTURAL & FLOATING FOUNTAINS 11494 COLUMBIA PARK DR. WEST SUITE #4 JACKSONVILLE, FL 32258 V. (904) 886-9030 F. (904) 886-9089 consulting design manufacturing



LANDSCAPE LEGEND

- LIMIT OF LANDSCAPE CONSTRUCTION
- PROPOSED ALUMINUM EDGER
- EXISTING TREES TO REMAIN
- SHADE TREE
- ORNAMENTAL TREE
- EVERGREEN TREE
- DECIDUOUS SHRUB
- EVERGREEN SHRUB
- ORNAMENTAL GRASS
- PERENNIALS & SEDGES
- SPRING BULBS - PROVIDE AT QUANS & LOCATIONS INDICATED ON PLAN, SEE LANDSCAPE DETAILS
- BENCH - SEE SPECIFICATIONS
- ILLUMINATED BENCH - SEE ELECTRICAL AND SPECIFICATIONS
- TRASH RECEPTACLE - SEE SPECIFICATIONS
- RECYCLING RECEPTACLE - SEE SPECIFICATIONS

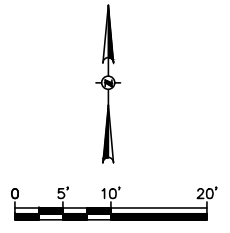
LANDSCAPING NOTES:

1. SEE WRITTEN SPECIFICATIONS AND DETAILS FOR PLANTING METHODS, REQUIREMENTS, SOIL TESTING, MATERIALS, EXECUTION AND PLANT PROTECTION, PLANT STAKING METHODS, PLANT PIT DIMENSIONS, BACKFILL AND OTHER RELATED REQUIREMENTS.
2. PLANT PLACEMENT IS REQUIRED AS SHOWN ON THE LAYOUT, PLANTING, AND OTHER DRAWINGS.
3. PLANT NAMES ARE ABBREVIATED ON THE DRAWINGS. SEE PLANT LIST FOR SYMBOLS, ABBREVIATIONS, BOTANICAL/Common NAMES, SIZES, ESTIMATED QUANTITIES (IF GIVEN) AND OTHER REMARKS.
4. MAINTAIN AND WARRANT PLANT MATERIALS AS DESCRIBED IN WRITTEN SPECIFICATIONS.
5. PLANT BEDS ARE TO RECEIVE 3" DEEP LAYER OF SHREDDED HARDWOOD BARK MULCH PER WRITTEN SPECIFICATIONS AND DETAILS.
6. FORM 72-INCH, OR AS OTHERWISE INDICATED, WATERING BASIN AROUND TREES NOT INSTALLED IN PAVED AREAS. SEE PLANTING DETAILS.
7. FINE GRADE, RAKE, AND ENSURE POSITIVE DRAINAGE AWAY FROM STRUCTURES AND THROUGHOUT SITE WITHIN THE LIMITS OF CONSTRUCTION, WITH ACCURATELY SET FLOW LINES. LOW SPOTS OR PONDING OF SURFACE WATER WILL NOT BE ACCEPTED IN THE FINAL WORK. ROCKS OR DEBRIS WILL NOT BE ACCEPTED. FINAL GRADE TOLERANCES ARE +/-0.1 FOOT MAXIMUM.
8. RESTORE AREAS OF THE SITE, OR ADJACENT AREAS, WHERE DISTURBED. DAMAGE CAUSED DURING LANDSCAPE INSTALLATION TO EXISTING CONDITIONS AND IMPROVEMENTS IS THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.
9. FOLLOWING TESTING & ANALYSIS OF TOPSOIL, INCORPORATION OF RECOMMENDED AMENDMENTS, AND TOPSOIL PLACEMENT, ALL PLANT BED AREAS SHALL BE PREPARED AS DESCRIBED IN WRITTEN SPECIFICATIONS.
10. TAKE NECESSARY SCHEDULING AND OTHER PRECAUTIONS TO AVOID WINTER, CLIMATIC, OR OTHER DAMAGE TO PLANTS.
11. PLANT SUBSTITUTIONS WILL NOT BE PERMITTED UNLESS THE LANDSCAPE CONTRACTOR CAN DEMONSTRATE THE PLANTS ARE NOT AVAILABLE FROM NURSERY SOURCES LOCATED WITHIN 100 MILES FROM THE PROJECT SITE. ANY PROPOSED PLANT SUBSTITUTION WILL REQUIRE PRIOR REVIEW AND WRITTEN ACCEPTANCE BY THE LANDSCAPE ARCHITECT.
12. DETERMINE THE NEED FOR TREE STAKING. IF DETERMINED NECESSARY, PROVIDE TREE STAKING AS DESCRIBED IN WRITTEN SPECIFICATIONS.

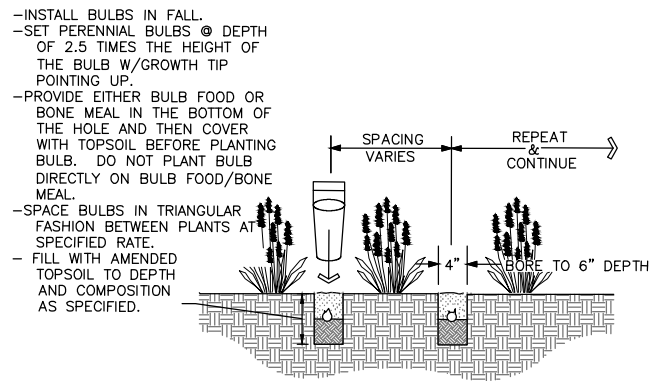
PLANT LIST

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	MATURE SIZE
TREES					
AGA	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Senceberry	2" BB, SS	as shown	20'h x 15'w
SPM	Syringa pekinensis 'Morton'	China Snow Peking Lilac	10-12"clump BB	as shown	25'h x 20'w
DECIDUOUS SHRUBS					
CSB	Comus sericea 'Bergeson Compact'	Bergeson Compact Dogwood	24" ht	5'	4-6'h x 4-6'w
DVL	Diervilla lonicera	Dwarf Bush Honeysuckle	24" ht	4'	4'h x 4'w
HLL	Hydrangea paniculata 'Little Lime'	Dwarf Limelight Hydrangea	24" ht	4'	3-4'h x 3-4'w
RRD	Rosa rugosa 'Dwarf Pavement'	Dwarf Pavement Rugosa Rose	18" ht	4'	2-3' h x 4' w
VPT	Viburnum plicatum var. tomentosum	Doublefile Viburnum	36" ht	8'	8-10'h x 9-12'h
EVERGREEN SHRUBS					
TMT	Taxus x media 'Tauntonii'	Taunton Spreading Yew	30" ht.	5'	3-4'h x 4-6'w
PERENNIALS					
ALM	Alchemilla mollis	Lady's Mantle	1 gal.	24"	15" h x 24" w
ASB	Allium 'Summer Beauty'	Summer Beauty Onion	4" pot	12"	16"-20" h x 12"
BAB	Baptisia australis	Blue False Indigo	1 gal.	36"	3-4'h x 2-3'w
BAS	Boltonia Asteroides 'Snowbank'	Bolton's Aster	1 gal.	24"	3-5'h x 24" w
CNM	Calamintha nepeta 'Montrose White'	Montrose White Calamint	1 gal.	24"	18" h x 24" w
DSP	Dicentra spectabilis	Old Fashioned Pink Bleeding Heart	1 gal.	36"	36" h x 36" w
HLG	Hemerocallis 'Little Grapette'	Little Grapette Daylily	1 gal.	18"	12"-15" h x 18" w
HMS	Hemerocallis 'Strawbery Candy'	Strawbery Candy Daylily	1 gal.	24"	26" x 24" w
HGM	Hosta 'Guacamole'	Guacamole Hosta	1 gal.	36"	18" h x 30" w
IGF	Iris germanica 'Feedback'	Feedback Bearded Iris	1 gal.	24"	36" h x 24" w
NWL	Nepeta x faasseni 'Walker's Low'	Walker's Low Catmint	1 gal.	36"	24" h x 24-36" w
PBZ	Paeonia x 'Bartzella'	Bartzella Itoh Peony	1 gal.	36"	30"-36" h x 30"-36" w
SRF	Solidago rugosa 'Fireworks'	Fireworks Goldenrod	1 gal.	24"	3-4'h x 24" w
TPS	Thymus pseudolaniginosus	Wooly Thyme	4" pot	15"	1"-2" h x 12"-24" w
ORNAMENTAL GRASSES & SEDGES					
CAK	Calamagrostis acutiflora 'Karl Foerster'	Feather Reed Grass	1 gal.	36"	5'h x 30" w
CAB	Carex bicknellii	Copper Shouldered Oval Sedge	4" pot	18"	1'-3" h x 18" w
CPN	Carex pennsylvanica	Pennsylvania Sedge	4" pot	18"	10" h x 18" w
DSC	Deschampsia cespitosa	Tufted Hair Grass	4" pot	24"	24" h x 24" w
PVS	Panicum virgatum 'Shenandoah'	Shenandoah Switch Grass	1 gal.	30"	3'h - 30" w
SOC	Scizachyrium scoparium 'Carousel'	Carousel Little Bluestem	1 gal.	24"	30" h x 30" w
SON	Sorghastrum nutans	Indiangrass	1 gal.	30"	4-6'h x 24" w
SPT	Sporobolus heterolepis 'Tara'	Tara Dwarf Prairie Dropseed	4" pot	24"	18" h x 24" w
SPRING BULBS					
AAP	Allium afiatunense 'Purple Sensation'	Purple Sensation Allium	min. 4" circumf.	as shown	24"-30" h
	Crocus Mixture - 'Flower Record', 'Grand Maitre' & 'Pickwick'	Majestic Lavender Crocus Mixture as mfg by John Sheepers (www.johnsheepers.com)	min. 9cm circumf.	4" o.c.	5" h
CML	Muscari amerniacum	Blue Grape Hyacinth	as shown	as shown	6" h
MUA	Muscari amerniacum	Blue Grape Hyacinth	as shown	as shown	6" h
NDM	Narcissus 'Dutch Master'	Dutch Master Daffodil	min. 4" circumf.	as shown	16"-18" h
NIF	Narcissus 'Ice Follies'	Ice Follies Large Cupped Daffodil	min. 4" circumf.	as shown	18"-20h

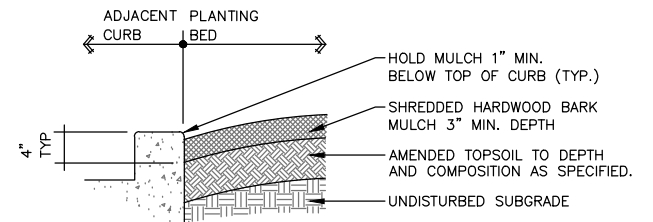
X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\JamesL\100_Landscape Plan 2/17/2020 1:28 PM



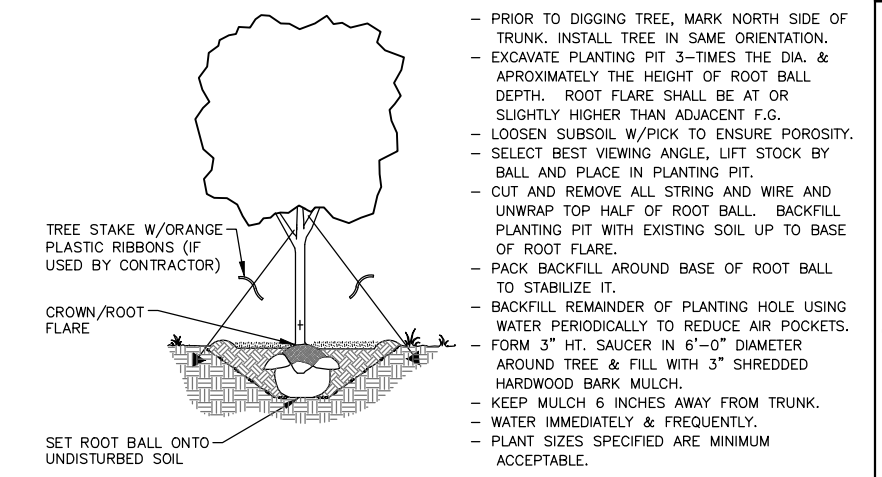
X:\ENGIN\Projects\City Projects\2020\Project 20-02 Utility and Street Reconstruction\1200- CAD\James\1500_Landscape Details 2/17/2020 1:29 PM



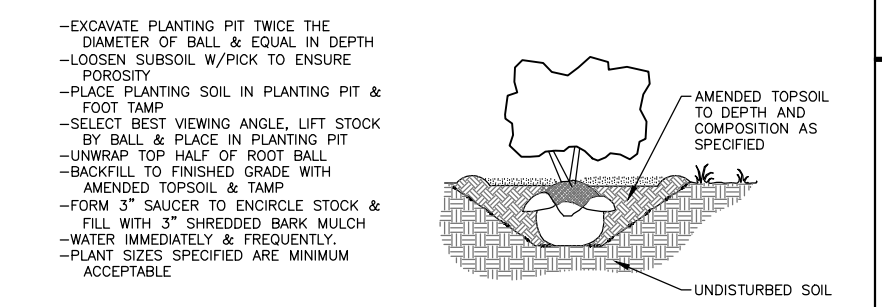
4 BULB PLANTING DETAIL



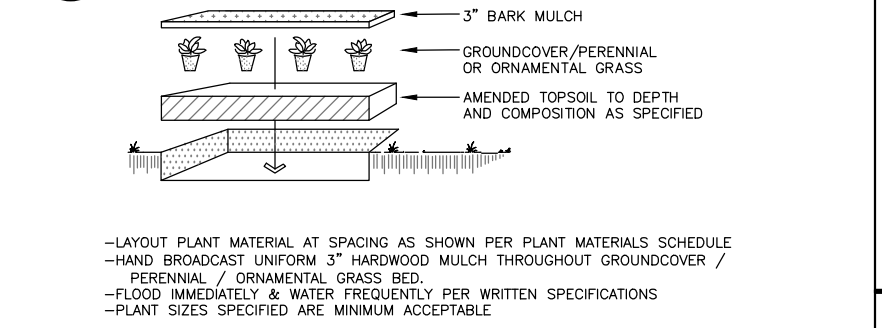
5 PLANT BED EDGE AT CURB



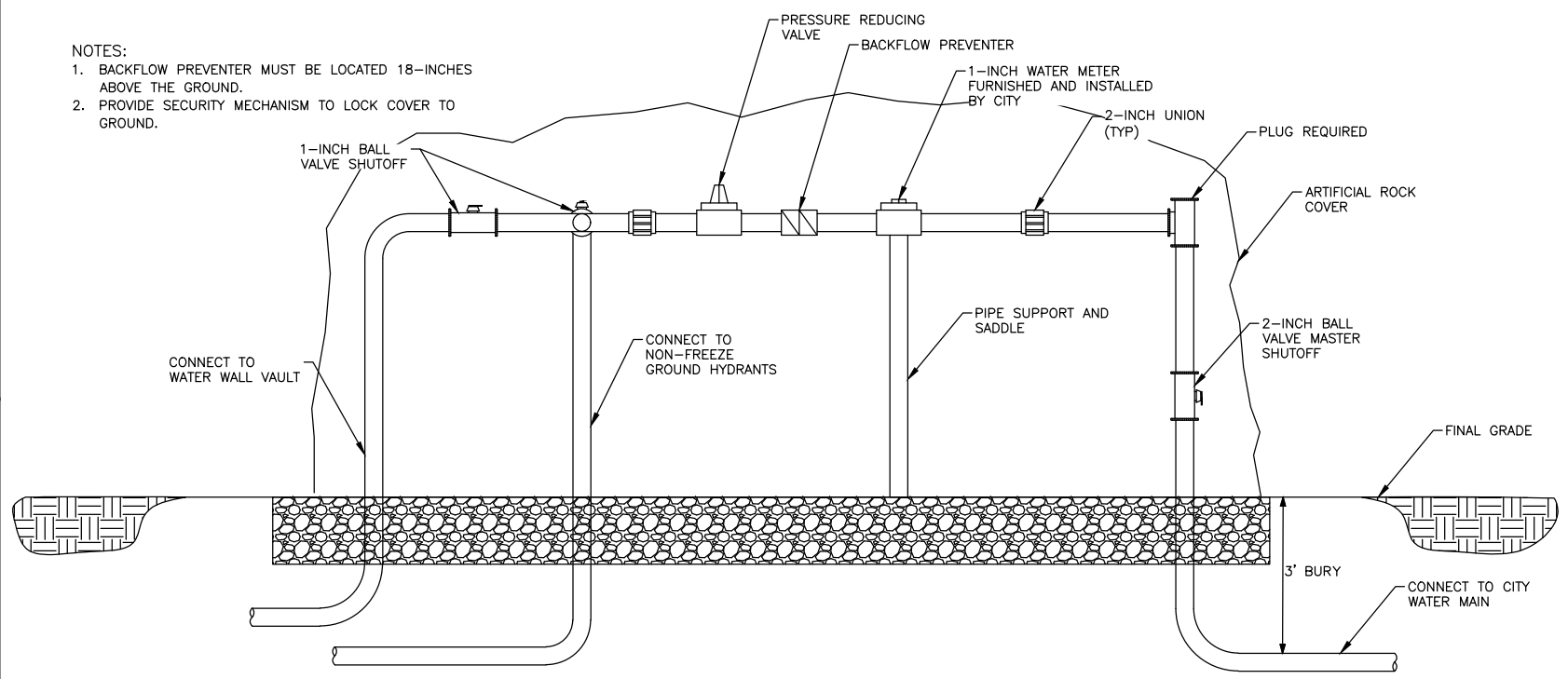
1 TREE PLANTING DETAIL



2 SHRUB PLANTING DETAIL



3 GROUND COVER / ORNAMENTAL GRASS / PERENNIAL PLANTING DETAIL



6 WATER METER ASSEMBLY

NOTES:
 1. BACKFLOW PREVENTER MUST BE LOCATED 18-INCHES ABOVE THE GROUND.
 2. PROVIDE SECURITY MECHANISM TO LOCK COVER TO GROUND.



1150 Springhurst Drive,
 Suite 201
 Green Bay, WI 54304-5947
 920 / 592 9440
 920 / 592 9445 fax

www.graef-usa.com

CONSULTANTS:

PROJECT TITLE:

STREET RECONSTRUCTION AND UTILITY RELAY

400 James Street
 De Pere, WI 54115

NO.	DATE	REVISIONS	BY
	2/4/20	CITY OF DE PERE MODIFICATIONS	

PROJECT INFORMATION:

PROJECT NUMBER: 2018-1013
 DATE: 03-28-19
 DRAWN BY: CEP
 CHECKED BY: RPV
 APPROVED BY: PJS
 SCALE: As Noted

SHEET TITLE:

LANDSCAPE DETAILS

SHEET NUMBER:

L500